रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD
सी ई एन - 06/2025 - CEN - 06/2025
एनटीपीसी (स्नातक स्तर) की भर्ती / Recruitment of NTPC Graduate Level

RRB NTPC Graduate 2025 CBT-1

NTPC Graduate Level · CEN 06/2025 · CBT-1 · Mathematics · Question Paper

English

All 24 Shifts (Sets) · Mathematics Section · Official Answer Key

About this Compilation

This booklet contains all **24 shift papers** of the **RRB NTPC Graduate 2025 CBT-1** examination in **English** (**Mathematics** section only), with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

Sections. The saved NTPC Graduate CBT-1 paper carries no section labels. In this book the questions of every shift are grouped into the three exam sections (Mathematics, General Intelligence and Reasoning, General Awareness incl. General Science), assigned from our topic tags, so the section counts may differ slightly from the notified pattern (30 / 30 / 40). Question numbers and answers are the same as in our complete paper book.

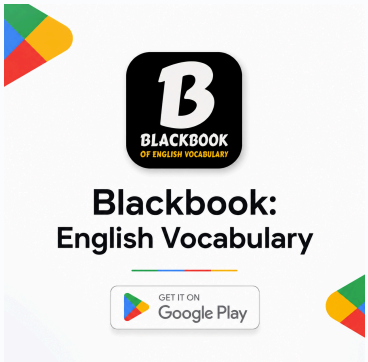
8 questions without question text. The saved paper record has no question text or figure for them; they are printed with their options and official answer and marked in the text.

How to use

- Use the **Index** page to jump directly to any set (clickable).
- Questions appear section by section in the order of the paper, numbered 1 onward.
- Diagram and wide-table questions appear at full width at the end of their section.
- The correct answer is highlighted in green with a tick.

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Index — All Sets (click to open)

- Set 1 — 16 Mar 2026, 9:00 AM - 10:30 AM
- Set 2 — 16 Mar 2026, 12:45 PM - 2:15 PM
- Set 3 — 16 Mar 2026, 4:30 PM - 6:00 PM
- Set 4 — 17 Mar 2026, 9:00 AM - 10:30 AM
- Set 5 — 17 Mar 2026, 12:45 PM - 2:15 PM
- Set 6 — 17 Mar 2026, 4:30 PM - 6:00 PM
- Set 7 — 18 Mar 2026, 9:00 AM - 10:30 AM
- Set 8 — 18 Mar 2026, 12:45 PM - 2:15 PM
- Set 9 — 18 Mar 2026, 4:30 PM - 6:00 PM
- Set 10 — 19 Mar 2026, 9:00 AM - 10:30 AM
- Set 11 — 19 Mar 2026, 12:45 PM - 2:15 PM
- Set 12 — 19 Mar 2026, 4:30 PM - 6:00 PM
- Set 13 — 22 Mar 2026, 9:00 AM - 10:30 AM
- Set 14 — 22 Mar 2026, 12:45 PM - 2:15 PM
- Set 15 — 22 Mar 2026, 4:30 PM - 6:00 PM
- Set 16 — 24 Mar 2026, 9:00 AM - 10:30 AM
- Set 17 — 24 Mar 2026, 12:45 PM - 2:15 PM
- Set 18 — 24 Mar 2026, 4:30 PM - 6:00 PM
- Set 19 — 25 Mar 2026, 9:00 AM - 10:30 AM
- Set 20 — 25 Mar 2026, 12:45 PM - 2:15 PM
- Set 21 — 25 Mar 2026, 4:30 PM - 6:00 PM
- Set 22 — 27 Mar 2026, 9:00 AM - 10:30 AM
- Set 23 — 27 Mar 2026, 12:45 PM - 2:15 PM
- Set 24 — 27 Mar 2026, 4:30 PM - 6:00 PM

Mathematics

30 Questions • Answer Key

Q1 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-4) × 7

- A. -41 ✓
- B. -40
- C. -44
- D. -43

Q2 Mathematics

Three printing machines, P, Q and R, when each is working alone, can print one lakh books in, respectively, 8 hours, 16 hours and 24 hours. These machines print books in turns of one hour each, starting with P, followed by Q and then by R. However, after a total of 9 hours, P stops functioning, but Q and R continue working alternately for an hour each, with Q working during the 10th hour, till the printing of all the one lakh books is completed. In how many hours in all did machines Q and R complete printing the remaining books?

- A. 6 ✓
- B. 9
- C. 12
- D. 15

Q3 Mathematics

In a triangle PQR, ∠QOR = 130°, where O is the in-centre of triangle PQR. The measure of ∠QPR is:

- A. 80° ✓
- B. 60°
- C. 70°
- D. 50°

Q4 Mathematics

P sells an item to Q at 50% profit. Q sells the same item to R at 60% loss. If R paid ₹ 3234 for the item, then at what price (in ₹) is the item purchased by P?

- A. 5387
- B. 5391
- C. 5393
- D. 5390 ✓

Q5 Mathematics

At what rate (in percentage) per year will a sum of money double itself in 16 years on simple interest?

- A. 6.25 ✓
- B. 12.5
- C. 4.25
- D. 8.25

Q6 Mathematics

Find the area of a regular hexagon whose side measures 14√3 cm.

- A. 882√3 cm2 ✓
- B. 509√3 cm2
- C. 441√3 cm2
- D. 294√3 cm2

Q7 Mathematics

Two taps can fill a cistern in 4 hours and 38 hours respectively. A third tap can empty it in 38 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

- A. 2
- B. 3
- C. 1 ✓
- D. 4

Q8 Mathematics

There are 78 members in group A, 22 members in group B and 34 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹136, ₹383 and ₹457, respectively. The overall average amount (in ₹) spent per member is:

- A. 255
- B. 261
- C. 256
- D. 258 ✓

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Q9 Mathematics

If both the roots of the quadratic equation $A(8x^2 + 4) + Bx + 4x^2 - 8 = 0$ and $3A(2x^2 + 1) + Kx + 3x^2 - 6 = 0$ are common, then what is the value of $9B^2 - 16K^2$?

A. −1

B. 0 ✓

C. 1

D. 2

Q10 Mathematics

What is the maximum value that must be assigned to A so that the 8-digit number 816A0408 is divisible by 4?

A. 7

B. 5

C. 9 ✓

D. 4

Q11 Mathematics

The average of 13 numbers is 8. If each number is multiplied by 7, then what will the new average be:

A. 7

B. 56 ✓

C. 8

D. 13

Q12 Mathematics

Anand has ₹1407 with him. He divides this amount between his two sons, Anil and Ashok, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Anil's investment amounts to the same value after 15 years as Ashok's investment does after 16 years. How much (in ₹) did Anand give to Ashok?

A. 837

B. 520

C. 737

D. 670 ✓

Q13 Mathematics

Find the third proportional to the numbers 16 and 24.

A. 40

B. 36 ✓

C. 30

D. 32

Q14 Mathematics

If the median of a data is 61.54 less than its mode, then the median of the data exceeds its mean by _____. (Use the empirical formula to find the answer)

A. 28.47

B. 36.77

C. 32.03

D. 30.77 ✓

Q15 Mathematics

At present, Sharad is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 63 years, then Sharad's present age (in years) is:

A. 55

B. 50

C. 35

D. 45 ✓

Q16 Mathematics

A dealer buys two articles X and Y for ₹500 each. He marks each of them at the same price. He sells X by giving two successive discounts of 50% and 28% and still earns ₹958 as profit. If he sells Y at a single discount of 77%, then what is the profit percentage on Y?

A. 85.3%

B. 86.3% ✓

C. 86%

D. 85%

Q17 Mathematics

Girish scored 572 marks in an examination and was 30 marks short of 28% of maximum marks. In the same examination, his friend scored 473 marks. What is the percentage of marks scored by his friend?

A. 21%

B. 23%

C. 24%

D. 22% ✓

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Q18 Mathematics

Three friends X, Y and Z started a business by investing a sum of money in the ratio of 4 : 2 : 5. After 6 months, X withdraws half of his capital. If the sum invested by Z is ₹23,000, then out of a total annual profit of ₹37,000, what is the difference between X's and Y's profit?

A. ₹3065
B. ₹4255
C. ₹5015
D. ₹3700 ✓

Q19 Mathematics

A tower stands vertically on the ground. From a point on the ground which is 28.6 m away from the foot of a tower, the angle of elevation of the top of the tower is found to be 45°. Find the height of the tower.

A. 28.6 m ✓
B. 24.6 m
C. 22.6 m
D. 26.6 m

Q20 Mathematics

20% of a number is more than 20% of 620 by 210. The number is:

A. 1720
B. 1770
C. 1520
D. 1670 ✓

Q21 Mathematics

A train travelling at 60 km/hr crosses another train travelling in the opposite direction at 84 km/hr in 30 seconds. What is the combined length (in m) of both the trains?

A. 1000
B. 1300
C. 1200 ✓
D. 1100

Q22 Mathematics

Find the area of a quadrilateral ABCD whose area is twice the area of a triangle PQR. The sides of triangle PQR are in the ratio 4:5:6 and the perimeter of the triangle is 90 cm (use $\sqrt{7} = 2.6$).

A. 698 cm2
B. 702 cm2 ✓
C. 763 cm2
D. 656 cm2

Q23 Mathematics

If $a : b = 2 : 3$, then $(7a^3 - 2b^3) : (b^3 - a^3) =$

A. 13 : 6
B. 3 : 11
C. 2 : 19 ✓
D. 3 : 14

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Q24 Mathematics

There is a wooden block in the form of a cube whose each side is 8 meters long.

The maximum possible number of cylinders with a diameter of 1 meter and a height of 4 meters were cut from this block.

The cylinders are to be painted at the rate of ₹14 per square meter.

What is the total amount (in ₹) needed to paint all the cylinders if we paint the entire surface of each cylinder? $\left(\text{Take } \pi = \frac{22}{7}\right)$

A. 24,527

B. 23,455

C. 24,325

D. 25,344 ✓

Q25 Mathematics

The mean marks of the following distribution is:

Marks Obtained	No. of Students
81	15
35	4
73	3
56	16

A. 60

B. 51

C. 65 ✓

D. 74

Q26 Mathematics

A boat can row 36 km downstream in the same time as it takes to row 24 km upstream. If the speed of the stream is 3 km/h, what is the speed of the boat in still water?

A. $12\ \text{km/h}$

B. $18\ \text{km/h}$

C. $15\ \text{km/h}$ ✓

D. $21\ \text{km/h}$

Q27 Mathematics

$$\frac{\sqrt[3]{6859}}{\sqrt[4]{256}} \times \frac{2}{57} \times 168 = ?$$

A. 38

B. 30

C. 28 ✓

D. 37

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Q28 Mathematics

If $(y-12)=4\sqrt{5}$, then find the value of $\sqrt{y-3}-\frac{1}{\sqrt{y-3}}$.

A. 8

B. 6

C. 4 ✓

D. 9

Q29 Mathematics

By selling an article at $\frac{6}{15}$ of its actual selling price, Hitesh incurs a loss of 28%.

If he sells it at 89% of its actual selling price, then the profit percentage is

A. 60.5%

B. 59.2%

C. 60.2% ✓

D. 60.7%

Q30 Mathematics

The sum of two numbers is 56. Their difference is $\frac{1}{7}$ of their sum. Their LCM is:

A. 72

B. 96 ✓

C. 84

D. 63

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

Which ratio is the largest among 5 : 12, 14 : 31, 8 : 33 and 17 : 39?

A. 5 : 12
B. 17 : 39
C. 8 : 33
D. 14 : 31 ✓

Q2 Mathematics

The average of 11 results is 61. If the average of the first 6 results is 64 and that of the last 6 is 61, find the 6^{th} result.

A. 81
B. 80
C. 78
D. 79 ✓

Q3 Mathematics

A number when increased by 25% becomes equal to another number, which is 20% less than a third number. What is the ratio of the first number to the third number?

A. 9:16
B. 27:38
C. 16:25 ✓
D. 25:36

Q4 Mathematics

Suman, Kunal, and Pooja invest ₹1050, ₹1510, and ₹1280 respectively to start a business. If the profit at the end of the year is ₹1650, then what is the share of Pooja in the profit?

A. ₹551
B. ₹550 ✓
C. ₹548
D. ₹549

Q5 Mathematics

Solve the following system of 3 equations in 3 unknowns.

$x - 3z = -5$
$2x - y + 2z = 16$
$7x - 3y - 5z = 19$

A. x = 4, y = −2, z = −3
B. x = 4, y = −2, z = 3 ✓
C. x = −4, y = 3, z = −2
D. x = −4, y = 2, z = −3

Q6 Mathematics

Along a circular running track, P can complete 5 rounds in 40 minutes. Time taken by R to complete 7 rounds is equal to time taken by P to complete 6 rounds. If they start running in the same direction from two different ends of a diameter, then they will meet for the first time after ___ minutes.

A. 28
B. 24 ✓
C. 20
D. 30

Q7 Mathematics

Reema and Juhi, when each is working alone, can complete a piece of work in, respectively, 12 days and 36 days. Each work on alternate days, with Reema and Juhi starting to work on Day 1 and Day 2, respectively. How many days in all will it take to complete the work?

A. 28
B. 18 ✓
C. 24
D. 16

Q8 Mathematics

The price of fuel decreases by 40%, 60% and 60% in three successive months, but increases by 70% in the fourth month. What is the percentage increase or decrease in the price of fuel in the fourth month as compared to its original price?

A. Decrease by 84.38%
B. Increase by 87.04%
C. Increase by 80.38%
D. Decrease by 83.68% ✓

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Q9 Mathematics

Jaspreet deposited a sum of ₹28,450 at 20% rate of interest per annum, compounded annually. The total amount received by Jaspreet after 2 years is:

A. ₹40,958
B. ₹40,968 ✓
C. ₹40,624
D. ₹41,126

Q10 Mathematics

A dealer buys two articles X and Y for ₹800 each. He marks each of them at the same price. He sells X by giving two successive discounts of 45% and 73% and still earns ₹523 as profit. If he sells Y at a single discount of 89%, then what is the profit percentage on Y?

A. 21%
B. 22.5% ✓
C. 22%
D. 21.5%

Q11 Mathematics

If the equations $x^2 - 3px + q = 0$ and $x^2 - 2kx + t = 0$ have one common root, and the first equation has equal roots, what is the value of $(t + q)^2$?

A. 4pk
B. 0
C. 9p2k2 ✓
D. (3p – 2k)

Q12 Mathematics

The LCM of two numbers is 1116 and their HCF is 186. If one of the number is 372, then the other number is

A. 558 ✓
B. 372
C. 930
D. 465

Q13 Mathematics

The following dataset represents the number of books read by 25 students in a month: 2 , 4 , 4 , 5 , 5 , 5 , 6 , 7 , 7 , 7 , 7 , 8 , 8 , 9 , 9 , 10 , 10 , 11 , 11 , 12 , 13 , 13 , 13 , 15 , 16. Calculate the mode of the dataset.

A. 5
B. 13
C. 7 ✓
D. 11

Q14 Mathematics

Two trains are moving in opposite directions at speeds of 110 km/hr and 120 km/hr. The length of one train is 450 m. The time taken by them to cross each other is 12 seconds. The length (in m) of the other train (rounded off to 2 decimal places) is:

A. 317.34
B. 314.28
C. 316.67 ✓
D. 318.7

Q15 Mathematics

100 men have provisions for 26 days. If 50 men have left, for how many days the same provisions would last for the remaining men?

A. 56
B. 50
C. 54
D. 52 ✓

Q16 Mathematics

At what rate (in percentage) per year will a sum of money 5 times itself in 16 years on simple interest?

A. 50
B. 23
C. 25 ✓
D. 27

Q17 Mathematics

The average of the first 62 even natural numbers is:

A. 63 ✓
B. 64
C. 61
D. 62

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Q18 Mathematics

A shopkeeper professes to sell his goods at a 60% loss but uses a false balance and gains 90%. The actual weight (rounded off to one decimal place) he uses for 1 kg is:

- **A.** 210.5 gm ✓
- **B.** 214.1 gm
- **C.** 209.5 gm
- **D.** 213.6 gm

Q19 Mathematics

If a : b :: b : c; c = 4a; and b = 6, find the positive value of c.

- **A.** 12 ✓
- **B.** 8
- **C.** 16
- **D.** 20

Q20 Mathematics

A boy flying a kite holds the string of length 24.4 m such that it makes an angle of 30° with the ground. Find the height of the kite from the ground.

- **A.** 13.6 m
- **B.** 12.2 m ✓
- **C.** 13.2 m
- **D.** 11.5 cm

Q21 Mathematics

A shopkeeper purchased 59 dozens of articles at the rate of ₹520 per dozen. He sold each one of them at the rate of ₹52. What percentage profit did he make?

- **A.** 19%
- **B.** 20% ✓
- **C.** 23%
- **D.** 21%

Q22 Mathematics

$$If\ 15\%\ of\ 80\ -\frac{3}{6}\times\sqrt[3]{216}\times\sqrt{36}=y,\ then\ the\ value\ of\ y\ is$$

- **A.** -10
- **B.** -3
- **C.** -6 ✓
- **D.** -12

Q23 Mathematics

Side PQ of a cyclic quadrilateral PQRS is produced to the point T. If $\angle RQT = 58^{o}$, then the measure of $\angle PSR$ is:

- **A.** 29°
- **B.** 116°
- **C.** 58° ✓
- **D.** 122°

Q24 Mathematics

$$\text{Simplify: } \frac{732\times732\times732+268\times268\times268}{73.2\times73.2+26.8\times26.8-73.2\times26.8}$$

- **A.** 1000
- **B.** 100000 ✓
- **C.** 10000
- **D.** 100

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Q25 Mathematics

Simplify: $\frac{\sqrt[3]{2744}}{\sqrt[4]{256}} \times \frac{2}{42} \times 72$

A. 10

B. 12 ✓

C. 17

D. 5

Q26 Mathematics

A triangle ABC with sides 3 cm, 4 cm and 5 cm is revolved about the side 3 cm. Find the volume of the solid so obtained. (Use $\pi = 3.14$)

A. 42.62 cubic cm

B. 40.55 cubic cm

C. 50.24 cubic cm ✓

D. 55.61 cubic cm

Q27 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

A. 100°

B. 105° ✓

C. 98°

D. 112°

Q28 Mathematics

$\left[3.75 + \frac{4}{5}\right] - \left[3.5 - \frac{8}{20}\right]$

A. 1.45 ✓

B. 1.35

C. 1.5

D. 1.4

Q29 Mathematics

What is the mode of the data given below? [Give your answer correct to 2 decimal places.]

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of patients	36	29	35	22	18	38	26

A. 74.25

B. 76.25 ✓

C. 78.25

D. 72.25

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Q30 Mathematics

A conical tent is to be made for a school event. The radius of the base is 7 metres, and the height of the tent is 24 metres. A decorative cloth is to be used to cover the entire curved surface area of the tent. The cloth costs ₹40 per square metre. What will be the total cost of the cloth required?

$(\text{Use } \pi = \frac{22}{7})$

A. ₹22,000 ✓

B. ₹21,000

C. ₹23,800

D. ₹22,800

Blackbook

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Q1 Mathematics

At what rate per annum will a sum of money become five times itself in 5 years under simple interest?

A. 160%
B. 82%
C. 78%
D. 80% ✓

Q2 Mathematics

The internal surface area (in cm^2) of an open (at the top) cuboidal box whose internal length, breadth and height are 8 cm, 17 cm and 22 cm, respectively, is:

A. 1189
B. 1236 ✓
C. 1238
D. 1215

Q3 Mathematics

100 men have provisions for 27 days. If 55 men have left, for how many days the same provisions would last for the remaining men?

A. 64
B. 60 ✓
C. 62
D. 58

Q4 Mathematics

There are 72 members in group A, 12 members in group B and 87 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹404, ₹316 and ₹424, respectively. The overall average amount (in ₹) spent per member is:

A. 408 ✓
B. 409
C. 412
D. 404

Q5 Mathematics

Three positive integers, A, B, and C, are such that the least common multiple of A and B is 24, the least common multiple of B and C is 36, and the least common multiple of C and A is 72. If the numbers are taken to be as small as possible, the value of A + B + C is:

A. 29 ✓
B. 27
C. 25
D. 31

Q6 Mathematics

Three friends travel along three consecutive segments: from P to Q, Q to R, and R to S. Their speeds on these segments are 48 km/h, 72 km/h, and 96 km/h, respectively. The distances of the three segments are in the ratio 2 : 3 : 1, and the total distance from P to S is 480 km. Calculate the average speed for the entire journey.

A. 68 km/h
B. 58 km/h
C. 65 km/h
D. 64 km/h ✓

Q7 Mathematics

In an election between two candidates, 80% of the registered voters cast their vote and 10% of the votes polled were found invalid. Winning candidate got 89% of the valid votes and won the election by a margin of 351 votes. How many voters were registered?

A. 675
B. 650
C. 625 ✓
D. 600

Q8 Mathematics

A shopkeeper fixes the marked price of an item 180% above its cost price. What percentage of discount on marked price should be allowed to gain 12%?

A. 62%
B. 57%
C. 58%
D. 60% ✓

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Q9 Mathematics

During a sale 50% of the goods are sold at 16% profit, 40% of the remaining goods are sold at 35% profit and the still remaining goods are sold at a loss of 25%. If there is an overall profit of x%, then what is the value of x?

A. 8

B. 7.5 ✓

C. 9

D. 6

Q10 Mathematics

Find the average of 312, 126, 100 and 99.

A. 157.25

B. 158.25

C. 156.25

D. 159.25 ✓

Q11 Mathematics

The price of each article of type P, Q, and R is ₹280, ₹180 and ₹115, respectively. Tejas buys articles of each type in the ratio 4 : 2 : 5 for ₹6,165. How many articles of type Q did he purchase?

A. 3

B. 14

C. 6 ✓

D. 12

Q12 Mathematics

The total surface area of a solid cube each side of which is 84 cm long is:

A. 42336 cm2 ✓

B. 42359 cm2

C. 42292 cm2

D. 42365 cm2

Q13 Mathematics

Shan has ₹1407 with him. He divides this amount between his two sons, Piyush and Manoj, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Piyush's investment amounts to the same value after 18 years as Manoj's investment does after 19 years. How much (in ₹) did Shan give to Manoj?

A. 520

B. 670 ✓

C. 737

D. 837

Q14 Mathematics

If 160% of 75% of A is equal to two times the value of 150% of B, then A is more/less than B by how much percentage?

A. 150%, more ✓

B. 60%, less

C. 60%, more

D. 150%, less

Q15 Mathematics

A woman travelled at a speed of 20 m/min for 90 min, and at a speed of 55 m/min for 60 min. Her average speed (in m/min) for the entire journey is:

A. 34 ✓

B. 40

C. 38

D. 27

Q16 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 91 pages?

A. 1825

B. 1810

C. 1830

D. 1820 ✓

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Q17 Mathematics

Madhu and Madhuri start a business by investing in the ratio 31 : 34. If total profit is ₹44,850, then what is the difference between the shares of profit (in ₹) of Madhu and Madhuri?

A. ₹3,570

B. ₹1,570

C. ₹570

D. ₹2,070 ✓

Q18 Mathematics

A shopkeeper purchased 62 dozens of articles at the rate of ₹100 per dozen. He sold each one of them at the rate of ₹75. What percentage profit did he make?

A. 801%

B. 797%

C. 800% ✓

D. 798%

Q19 Mathematics

If 4 : 28 :: 4.1 : x and 4 : 32 :: 3 : y, then what is the ratio of x to y?

A. 288 : 238

B. 287 : 240 ✓

C. 285 : 241

D. 291 : 250

Q20 Mathematics

Six years hence, a father's age will be 3 times the age of his son. Six years ago, the father was 7 times as old as his son. Find the present ages (in years) of the father and son.

A. 50 and 14

B. 48 and 12 ✓

C. 52 and 16

D. 46 and 10

Q21 Mathematics

Find the length of the ladder if the angle of elevation of the ladder against a wall is 60° and the foot of the ladder is 11.5 m away from the wall.

A. $23\sqrt{3}$ cm

B. 11.5 m

C. 23 m ✓

D. $\frac{23\sqrt{3}}{2}$ m

Q22 Mathematics

If a is a positive integer such that the equations $(a^2 - 7a)x^2 + x + 12 = 0$ and $240x^2 + 8x + (a^2 - 4) = 0$ both have roots common, then the value of $\frac{(a+2)(a+3)}{a-4}$ is:

A. 26 ✓

B. 30

C. 42

D. 18

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Q23 Mathematics

Simplify $5\frac{1}{6} \div 6.2 \times 0.75 \div \left(\frac{1}{5} \times 40\right)$.

A. $\frac{2}{17}$

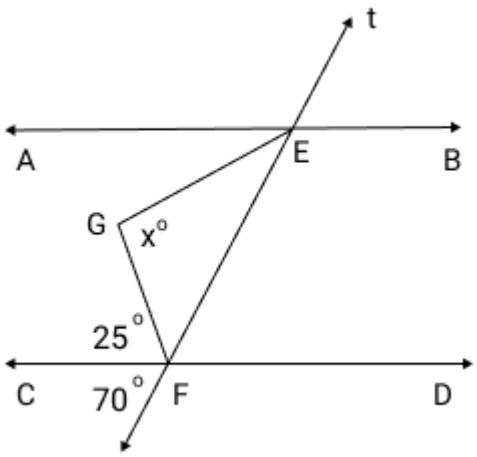
B. $\frac{5}{64}$ ✓

C. $\frac{9}{19}$

D. $\frac{7}{33}$

Q24 Mathematics

In the figure given, parallel lines, AB and CD, are intercepted by a transversal t at E and F, respectively. If EG is the angle bisector of ∠AEF, find ∠EGF.



A. 85o

B. 90o

C. 60o ✓

D. 35o

Q25 Mathematics

$If\ 30\%\ of\ 80\ -\frac{4}{7} \times \sqrt[3]{729} \times \sqrt{49} = y, then\ the\ value\ of\ y\ is$

A. -7

B. -8

C. -12 ✓

D. -3

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Q26 Mathematics

$If\ 45\%\ of\ 20\ -\frac{4}{6}\times\ \sqrt[3]{729}\times\ \sqrt{36}\ =\ y, then\ the\ value\ of\ y\ is$

- A. -27 ✓
- B. -30
- C. -21
- D. -35

Q27 Mathematics

Find the median from the following data.

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of patients	11	18	28	15	22	31	13

- A. 60
- B. 69
- C. 58 ✓
- D. 55

Q28 Mathematics

Find the mode of the following frequency distribution. (Round off the answer to two decimal places.)

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	8	12	20	10

- A. 33.35
- B. 34.44 ✓
- C. 31.51
- D. 32.25

Q29 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

- A. 11^{o}
- B. 8^{o}
- C. 18^{o}
- D. 14^{o} ✓

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Q30 Mathematics

If $(a+\frac{1}{a}) = 4$, then what is the value of $(a^5+\frac{1}{a^5})$?

A. 776

B. 709

C. 724 ✓

D. 770

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

P sells an item to Q at 70% profit. Q sells the same item to R at 67% loss. If R paid ₹ 3927 for the item, then at what price (in ₹) is the item purchased by P?

A. 7003
B. 6997
C. 7000 ✓
D. 6998

Q2 Mathematics

Evaluate: (-9) - (-60) ÷ (-6) + (-2) × 8

A. -38
B. -37
C. -35 ✓
D. -34

Q3 Mathematics

A and B start running on a circular track of length 900 m. A runs at 225 m/min and B at 180 m/min. Every time A overtakes B, both reduce their speeds by 5% of their then speeds before continuing. After how many minutes (correct to two decimal places) does A overtake B for the 3rd time?

A. 63.21 min ✓
B. 62.11 min
C. 64.41 min
D. 64.21 min

Q4 Mathematics

The product of two numbers, X and Y, is 6760, and the HCF of X and Y is 13. Find the number of possible pairs (X,Y), given that X>Y.

A. 1
B. 2 ✓
C. 4
D. 3

Q5 Mathematics

A woman travelled at a speed of 20 m/min for 90 min, and at a speed of 72 m/min for 66 min. Her average speed (in m/min) for the entire journey is:

A. 42 ✓
B. 35
C. 48
D. 46

Q6 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 15 years on simple interest?

A. 53.34
B. 24.67
C. 28.67
D. 26.67 ✓

Q7 Mathematics

A man sold an article for ₹132 by first giving a d% discount on its marked price, and then another discount having the same nominal value (in ₹). If the marked price of the article is ₹880, then what is the value of d?

A. 39.5
B. 37.3
C. 42.5 ✓
D. 46

Q8 Mathematics

A copper sphere of diameter 24 cm is melted and drawn into a wire of diameter 4 mm. What is the length (in metres) of the wire?

A. 576 ✓
B. 480
C. 580
D. 456

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Q9 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-3) × 8

A. -36

B. -37 ✓

C. -40

D. -39

Q10 Mathematics

What is the average of all the natural numbers from 1 to 63?

A. 31.5

B. 33

C. 32.5

D. 32 ✓

Q11 Mathematics

Two taps can fill a cistern in 4 hours and 27 hours respectively. A third tap can empty it in 27 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

A. 2

B. 3

C. 1 ✓

D. 4

Q12 Mathematics

A shopkeeper professes to sell his goods at a 25% loss but uses a false balance and gains 70%. The actual weight (rounded off to one decimal place) that he uses instead of 1 kg is:

A. 441.2 gm ✓

B. 438.1 gm

C. 443.3 gm

D. 436.4 gm

Q13 Mathematics

If cot A = 3/4, and A is an acute angle, then find the value of sin2A - cos3A.

A. 3/125

B. 273/125

C. 141/125

D. 237/125 ✓

Q14 Mathematics

Mahesh has ₹1407 with him. He divides this amount between his two sons, Vijay and Ajay, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Vijay's investment amounts to the same value after 17 years as Ajay's investment does after 18 years. How much (in ₹) did Mahesh give to Ajay?

A. 670 ✓

B. 520

C. 837

D. 737

Q15 Mathematics

A cube has a lateral surface area of 324 cm^2. It is fully submerged in a rectangular container of height 18 cm, having a square base and a lateral surface area of 864 cm^2. If the container was partially filled with water before the cube was submerged, find the rise in the water level after the cube is submerged.
(Round your answer to the nearest integer.)

A. 6 cm

B. 7 cm

C. 4 cm

D. 5 cm ✓

Q16 Mathematics

There are 12 members in group A, 73 members in group B and 80 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹184, ₹234 and ₹390, respectively. The overall average amount (in ₹) spent per member is:

A. 311

B. 306 ✓

C. 308

D. 305

Q17 Mathematics

₹7770 is divided among A, B, C, and D in such a way that the shares of A and B, B and C, and C and D are in the ratios of 2 : 3, 4 : 5, and 6 : 7, respectively. The share of A (in ₹) is:

A. 1224

B. 1124

C. 1184 ✓

D. 1154

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Q18 Mathematics

In an election between two candidates, 84% of the registered voters cast their votes and 20% of the votes polled were found invalid. Winning candidate got 58% of the valid votes and won the election by a margin of 336 votes. How many voters were registered?

A. 3124
B. 3123
C. 3120
D. 3125 ✓

Q19 Mathematics

The ratio of three numbers is 3 : 5 : 7. If the sum of the largest and smallest numbers is 60, what is the sum of all the three numbers?

A. 90 ✓
B. 120
C. 70
D. 100

Q20 Mathematics

The population of a village was 2,90,000. It increased by 10% in the first year and increased by 20% in the second year. Its population after two years is _____.

A. 3,48,000
B. 3,77,000
C. 3,82,800 ✓
D. 3,19,000

Q21 Mathematics

If a 7-digit number 54468A0 is completely divisible by 4, what is the minimum value of A?

A. 0 ✓
B. 5
C. 2
D. 3

Q22 Mathematics

A and B, when each is working alone, can complete a piece of work in. respectively, 20 days and 25 days. Each work on alternate days, with A and B starting to work on Day 1 and Day 2, respectively. How long will it take them to complete the work?

A. $22\frac{1}{5}$ days ✓
B. 23 days
C. 22 days
D. 11 days

Q23 Mathematics

If the mean of the following data is 35, find the value of X.

Class	10-20	20-30	30-40	40-50	50-60
Frequency	42	26	45	46	X

A. 32 ✓
B. 28
C. 34
D. 26

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Q24 Mathematics

If α is a root of the equation $2x(2x+1)=1$, then the other root is:

A. $2\alpha(\alpha-1)$

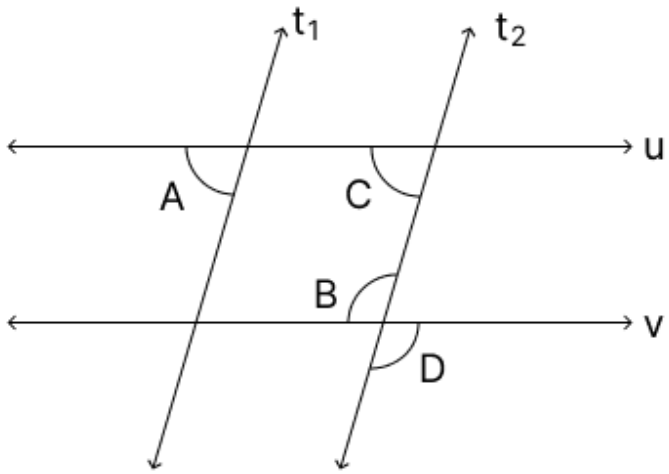
B. $-\alpha(\alpha+1)$

C. $3\alpha(\alpha+1)$

D. $-\frac{1}{4\alpha}$ ✓

Q25 Mathematics

In the given figure, if $u \parallel v$, $t_1 \parallel t_2$ and $\angle A = 92°$, find $\angle D$.



A. 82o

B. 88o ✓

C. 78o

D. 92o

Q26 Mathematics

Simplify: $\frac{(525\times525\times525)+(321\times321\times321)}{(525\times525)-(525\times321)+(321\times321)} \times \frac{1}{(96-36)}$

A. 15.9

B. 12.5

C. 13.1

D. 14.1 ✓

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Q27 Mathematics

The median for the following frequency distribution is:

x	1	2	3	4	5	6	7	8	9
f	8	10	11	16	20	25	15	9	6

A. 5 ✓

B. 8

C. 6

D. 4

Q28 Mathematics

Tejasvi, Trishana and Meena are three sisters. Tejasvi and Trishana are twins. The sum of the ages of Tejasvi and Trishana is the same as that of Meena. Four years earlier, the ratio of the ages of Tejasvi and Meena was 1:3. What will be the age of Trishana 4 years from now?

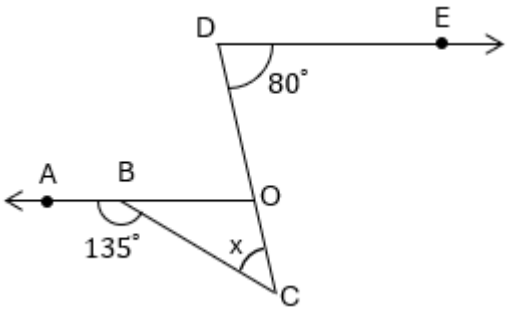
A. 18 years

B. 14 years

C. 16 years

D. 12 years ✓

Q29 Mathematics



A. 45°

B. 35° ✓

C. 100°

D. 145°

Q30 Mathematics

If a : b : c = 3 : 4 : 5 and 2a - 3b + 4c = 56, then the value of c is:

A. 21

B. 20 ✓

C. 22

D. 24

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

What is the maximum value that must be assigned to A so that the 8-digit number 718A5104 is divisible by 4?

A. 6
B. 5
C. 9 ✓
D. 4

Q2 Mathematics

Ishan has ₹1407 with him. He divides this amount between his two sons, Krish and Veer, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Krish's investment amounts to the same value after 13 years as Veer's investment does after 14 years. How much (in ₹) did Ishan give to Veer?

A. 737
B. 520
C. 670 ✓
D. 837

Q3 Mathematics

The average of six consecutive even numbers is 175. What is the smallest of these numbers?

A. 166
B. 168
C. 170 ✓
D. 172

Q4 Mathematics

A shopkeeper purchased 42 dozens of articles at the rate of ₹630 per dozen. He sold each one of them at the rate of ₹63. What percentage profit did he make?

A. 23%
B. 20% ✓
C. 21%
D. 17%

Q5 Mathematics

A, B and C together can complete a certain work in 54 days. B and C together can complete the same work in 56 days. B is 75% more efficient than A. A, B and C work together for 52 days. B alone will complete the remaining work in:

A. 30 days
B. 34 days
C. 27 days
D. 32 days ✓

Q6 Mathematics

Water flows out through a circular pipe, whose internal diameter is 2 cm, at the rate of 5 metres per second into a cylindrical tank, the radius of whose base is 100 cm. By how much will the level of water rise in 13 minutes?

A. 40 cm
B. 31 cm
C. 39 cm ✓
D. 30 cm

Q7 Mathematics

Three friends X, Y and Z started a business by investing a sum of money in the ratio of 5 : 3 : 7. After 6 months, X withdraws half of his capital. If the sum invested by Z is ₹14,000, then out of a total annual profit of ₹55,000, what is the difference between X's and Y's profit?

A. ₹1910
B. ₹4465
C. ₹3000 ✓
D. ₹3440

Q8 Mathematics

Anirudh travels 48 km at 12 km/h, 52 km at 13 km/h, and 120 km at 15 km/h. What is his average speed (in km/h)?

A. 12.5
B. 13.75 ✓
C. 14.5
D. 15

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Q9 Mathematics

Raghav earns a monthly salary of ₹24,000. He spends ₹7,500 on house rent and ₹3,500 on food and utility bills every month. The remaining amount is his monthly savings. In the month of his birthday, he spends his entire monthly saving on celebrations. Find Raghav's total savings in a year (in ₹).

A. 1,45,000
B. 1,38,000
C. 1,36,000
D. 1,43,000 ✓

Q10 Mathematics

A shopkeeper fixes the marked price of an item 150% above its cost price. What percentage of discount on marked price should be allowed to gain 130%?

A. 8% ✓
B. 10%
C. 5%
D. 7%

Q11 Mathematics

There are 30 members in group A, 72 members in group B and 75 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹434, ₹324 and ₹280, respectively. The overall average amount (in ₹) spent per member is:

A. 323
B. 321
C. 324 ✓
D. 326

Q12 Mathematics

If 15 men working 6 hours a day can complete a work in 20 days, how many days will 18 men working 5 hours a day take to complete the same work?

A. 24
B. 20 ✓
C. 15
D. 18

Q13 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-2) × 8

A. -31
B. -28
C. -32
D. -29 ✓

Q14 Mathematics

A shopkeeper professes to sell his goods at a 55% loss but uses a false balance and gains 75%. The actual weight (rounded off to one decimal place) he uses for 1 kg is:

A. 258.4 gm
B. 257.1 gm ✓
C. 253.1 gm
D. 260.7 gm

Q15 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money double itself in 15 years on simple interest?

A. 13.34
B. 6.67 ✓
C. 8.67
D. 4.67

Q16 Mathematics

Find the mean deviation from the mean for the following data set.
58, 65, 42, 66, 49, 59, 44, 45, 62, 60

A. 7.7
B. 7
C. 8 ✓
D. 7.4

Q17 Mathematics

Two taps can fill a cistern in 4 hours and 37 hours respectively. A third tap can empty it in 37 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

A. 2
B. 1 ✓
C. 4
D. 3

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Q18 Mathematics

The sum of the squares of two consecutive odd natural numbers is 5002. The sum of the numbers is:

- A. 96
- B. 100 ✓
- C. 110
- D. 112

Q19 Mathematics

Bell A rings every 18 minutes, bell B rings every 24 minutes and bell C rings every 30 minutes. They all ring together for the first time at 6:30 AM. Find the time at which the bells ring together for the third time.

- A. 9:30 PM
- B. 12:30 PM
- C. 6:30 PM ✓
- D. 3:30 PM

Q20 Mathematics

Two tangents AB and AC are drawn from an external point A to a circle with centre O. If AB = 30 cm and BC = 24 cm, then find the radius of the circle (in cm, rounded off to the nearest integer).

- A. 10
- B. 11
- C. 13 ✓
- D. 12

Q21 Mathematics

A recipe calls for 3 parts of sugar for every 4 parts of flour. If a baker uses 12 cups of sugar, how many cups of flour does he need to use to maintain the same ratio?

- A. 16 ✓
- B. 18
- C. 14
- D. 15

Q22 Mathematics

A motorboat has a speed of 25 km/h in still water. It takes 4 hours to cover a distance of 80 km upstream. Find the total time required by the boat to travel the same distance upstream and then return downstream.

- A. 5 hours 42 minutes
- B. 6 hours 20 minutes
- C. 6 hours 40 minutes ✓
- D. 5 hours 30 minutes

Q23 Mathematics

Simplify $\sqrt[3]{0.216} + \sqrt[3]{0.001} - \sqrt[3]{0.008}$.

- A. 0.5 ✓
- B. 0.2
- C. 0.4
- D. 0.6

Q24 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

- A. 68° ✓
- B. 58°
- C. 72°
- D. 63°

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Q25 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

A. $\frac{7\sqrt{3}}{4}$

B. $\frac{49\sqrt{6}}{6}$ ✓

C. $\frac{14\sqrt{46}}{3}$

D. $\frac{14\sqrt{3}}{45}$

Q26 Mathematics

Find the mean of the given data (correct to two places of decimal).

Class interval	0-8	8-16	16-24	24-32	32-40	40-48
Frequency	2	4	7	5	3	6

A. 26.22 ✓

B. 24.38

C. 29.29

D. 21.56

Q27 Mathematics

Solve the following system of equations:

$$3x-4y=6z-16$$
$$-4x+y+z=-5$$
$$x=3y+2(z-1)$$

A. $x=2, y=-2, z=5$ ✓

B. $x=2, y=-3, z=5$

C. $x=3, y=-2, z=5$

D. $x=3, y=-2, z=2$

Q28 Mathematics

In an election between two candidates, a candidate got 38% of the total votes and lost the election by 28,800 votes. What is the total number of voters?

A. 120,000 ✓

B. 122,000

C. 122,800

D. 124,000

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Q29 Mathematics

What is the volume (in cm^3) of a hemispherical cauldron with diameter 14 cm? (correct up to two decimal places) (Use $\pi = \frac{22}{7}$)

A. 681.33

B. 718.67 ✓

C. 618.67

D. 781.33

Q30 Mathematics

If x and y are two values such that their difference (x – y) is 5 and product (xy) is 21, then the value of $x^2 + y^2 + xy$ is:

A. 130

B. 180

C. 440

D. 88 ✓

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 24 years on simple interest?

A. 18.67
B. 14.67
C. 16.67 ✓
D. 33.34

Q2 Mathematics

Evaluate: 16 + 18 ÷ 6 - 2 × 4

A. 14
B. 13
C. 11 ✓
D. 10

Q3 Mathematics

Three positive integers a, b, and c satisfy: gcd(a, b)=12, gcd(b, c)=18, gcd(c, a)=6. If a+b+c=6k for some positive integer k, then the minimum possible value of k is:

A. 10
B. 9
C. 11 ✓
D. 12

Q4 Mathematics

Girish scored 831 marks in an examination and was 72 marks short of 35% of maximum marks. In the same examination, his friend scored 774 marks. What is the percentage of marks scored by his friend?

A. 28%
B. 32%
C. 34%
D. 30% ✓

Q5 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-4) × 6

A. -40
B. -37 ✓
C. -39
D. -36

Q6 Mathematics

P sells an item to Q at 30% profit. Q sells the same item to R at 52% loss. If R paid ₹ 3900 for the item, then at what price (in ₹) is the item purchased by P?

A. 6248
B. 6253
C. 6250 ✓
D. 6252

Q7 Mathematics

20% of a number is more than 20% of 620 by 220. The number is:

A. 1770
B. 1570
C. 1820
D. 1720 ✓

Q8 Mathematics

Which of the following is not a quadratic equation?

A. $3x^2 - 5x + 2 = 0$
B. $(x - 1)(x + 2) = x^2 + 3$ ✓
C. $x(x - 3) = 2$
D. $x^2 + 2x + 1 = 0$

Q9 Mathematics

A shopkeeper fixes the marked price of an item 180% above its cost price. What percentage of discount on marked price should be allowed to gain 152%?

A. 10% ✓
B. 9%
C. 7%
D. 8%

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Q10 Mathematics

A, B and C together can complete a certain work in 40 days. B and C together can complete the same work in 72 days. B is 50% more efficient than A. A, B and C work together for 16 days. B alone will complete the remaining work in:

- A. 38 days
- B. 35 days
- C. 34 days
- D. 36 days ✓

Q11 Mathematics

The arithmetic mean of 10 observations is 6 and the sum of nine of the observations is 49. Find the tenth observation.

- A. 11 ✓
- B. 10
- C. 9
- D. 13

Q12 Mathematics

The average of 5 numbers is 20. If one number is excluded, the average of the remaining numbers is 18. What is the excluded number?

- A. 32
- B. 30
- C. 25
- D. 28 ✓

Q13 Mathematics

A chemical engineer designs a cylindrical reaction vessel with inner radius 15 cm and height 40 cm. Inside this vessel, three identical cylindrical cooling tubes (each with radius 4 cm and same height as the vessel) are installed vertically. If the remaining space is filled to 75% capacity with reactive solution, what volume of solution (in liters) does the vessel contain? (Use π = 3.14) (Round your answer off to two decimal places.)

- A. 19.33 liters
- B. 18.15 liters
- C. 16.67 liters ✓
- D. 17.42 liters

Q14 Mathematics

Amit invested the same sum at simple and compound interest (compounded annually) for 2 years at 4% per annum. The difference between the compound interest and the simple interest is ₹47. Find the sum (in ₹) invested in each case.

- A. 28,475
- B. 28,625
- C. 29,725
- D. 29,375 ✓

Q15 Mathematics

At present, Vanraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 58 years, then Vanraj's present age (in years) is:

- A. 42 ✓
- B. 45
- C. 36
- D. 33

Q16 Mathematics

A data scientist finds that the mean proportional between two experimental values 18 and 32 needs to be increased by 25% for optimal model performance. If this new increased value becomes the mean proportional between 18 and another value y, what is y?

- A. 45
- B. 50 ✓
- C. 54
- D. 48

Q17 Mathematics

Two taps can fill a cistern in 4 hours and 31 hours respectively. A third tap can empty it in 31 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

- A. 4
- B. 1 ✓
- C. 2
- D. 3

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Q18 Mathematics

A man bought two types of chocolates, one at ₹8 for 9 chocolates and the other at ₹8 per chocolate. He purchased an equal number of each type and sold all the chocolates at ₹8 per piece. Find his percentage profit.

A. 78%

B. 84%

C. 80% ✓

D. 82%

Q19 Mathematics

A circle has a radius of 7 cm. Calculate the length of an arc that subtends a central angle of 240°. (Give your answer in cm, rounded up to two decimal places; Use π = 22/7)

A. 28.67 cm

B. 29.33 cm ✓

C. 27.33 cm

D. 31.33 cm

Q20 Mathematics

There are 42 members in group A, 14 members in group B and 21 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹275, ₹430 and ₹498, respectively. The overall average amount (in ₹) spent per member is:

A. 364 ✓

B. 366

C. 369

D. 365

Q21 Mathematics

The monthly incomes of A and B are in the ratio 4 : 5, and their monthly expenditures are in the ratio 3 : 4. A saves ₹10,000 while B saves ₹12,000, find the monthly income of A (in ₹)

A. 15,000

B. 16,000 ✓

C. 13,000

D. 14,000

Q22 Mathematics

Walking at $\frac{4}{7}$ of his normal speed from his home, Lakshya is 15 minutes late in reaching his office.

The usual time taken by him to cover the distance between his home and his office is

A. 29 minutes

B. 16 minutes

C. 23 minutes

D. 20 minutes ✓

Q23 Mathematics

The value of $\left[\frac{0.7^2 - 0.4^2}{0.33}\right]$ is:

A. 0.65

B. 2

C. 1.5

D. 1 ✓

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Q24 Mathematics

The marks scored by 100 students in Mathematics examination are given by the following table. Find the mode of this data (up to 2 decimal places).

Marks scored	35 - 44	45 - 54	55 - 64	65 - 74	75 - 84	85 - 94
No. of students	10	20	30	25	10	5

A. 61.17 ✓

B. 60.56

C. 55.44

D. 61.67

Q25 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

A. $\frac{4\cos A}{3}$ ✓

B. $\frac{\sin A}{3}$

C. $\frac{4\sin A}{3}$

D. $\frac{\cos A}{3}$

Q26 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

A. $\frac{22}{7}$

B. $\frac{18}{7}$

C. $\frac{36}{7}$

D. $\frac{44}{7}$ ✓

Q27 Mathematics

The speeds of two vehicles are 20 km/h and 45 km/h. Find the mean proportional between the two speeds.

A. $25\ \text{km/h}$

B. $30\ \text{km/h}$ ✓

C. $35\ \text{km/h}$

D. $32\ \text{km/h}$

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Q28 Mathematics

If $x+\frac{1}{18x}=3$, then the value of $18x^3+\frac{1}{324x^3}$ is:

- A. 477 ✓
- B. 465
- C. 491
- D. 431

Q29 Mathematics

Mr. Q travelled 336 km, 925 km and 432 km at a speed of 24 km/hr, 5 km/hr and 12 km/hr, respectively. Find his average speed in km/hr.

- A. $7\frac{47}{235}$
- B. $7\frac{51}{235}$
- C. $8\frac{46}{235}$
- D. $7\frac{48}{235}$ ✓

Q30 Mathematics

The radius of a solid cylinder is 12 cm, and its height is 25 cm. A three-dimensional sector with a sector angle of 45^o is removed from it, all along the height of the cylinder. What is the volume (in cm^3) of the larger piece of the cylinder?

- A. 3250π
- B. 3000π
- C. 3150π ✓
- D. 3200π

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

Kartik has ₹1407 with him. He divides this amount between his two sons, Ishan and Krish, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Ishan's investment amounts to the same value after 11 years as Krish's investment does after 12 years. How much (in ₹) did Kartik give to Krish?

A. 837
B. 670 ✓
C. 737
D. 520

Q2 Mathematics

Girish scored 416 marks in an examination and was 79 marks short of 33% of maximum marks. In the same examination, his friend scored 555 marks. What is the percentage of marks scored by his friend?

A. 37% ✓
B. 38%
C. 39%
D. 36%

Q3 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 22 years on simple interest?

A. 16.18
B. 36.36
C. 20.18
D. 18.18 ✓

Q4 Mathematics

A shopkeeper purchased 47 dozens of articles at the rate of ₹480 per dozen. He sold each one of them at the rate of ₹78. What percentage profit did he make?

A. 92%
B. 98%
C. 95% ✓
D. 93%

Q5 Mathematics

Let C be a circle with centre O. Let AB be a tangent to C such that AB touches the circle at point P. Let X and Y be any two points on C. If ∠APX = 50° and ∠BPY = 60°, then find ∠PXY and ∠PYX, respectively.

A. 60°, 120°
B. 50° , 60°
C. 60° , 50° ✓
D. 50° , 130°

Q6 Mathematics

There are 9,632 students in a school and the ratio of boys to girls in the school is 17 : 11, then find the number of boys in the school.

A. 5,831
B. 5,828
C. 5,851
D. 5,848 ✓

Q7 Mathematics

If the median of a data is 77.74 less than its mode, then the median of the data exceeds its mean by _____. (Use the empirical formula to find the answer)

A. 35.13
B. 37.09
C. 38.87 ✓
D. 44.11

Q8 Mathematics

100 men have provisions for 26 days. If 60 men have left, for how many days the same provisions would last for the remaining men?

A. 63
B. 65 ✓
C. 69
D. 67

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Q9 Mathematics

A tank is filled by three pipes, P, Q and R, with uniform flow. The first two pipes P and Q, operating simultaneously, fill the tank in the same amount of time that it takes for the tank to be filled by pipe R alone. Pipe Q fills the tank 15 hours faster than the first pipe and 12 hours slower than pipe R. What is the time required by pipe P to fill the tank?

A. 32 hours
B. 47 hours
C. 45 hours ✓
D. 25 hours

Q10 Mathematics

A solid is composed of a cube surmounted by a cuboid. The edge of the cube is x cm. The cuboid placed on top has a square base exactly fitting the top face of the cube, and its height is (x – 4) cm. If the total volume of the solid is 1.5 times the volume of the cube, what is the value of x?

A. 6
B. 8 ✓
C. 5
D. 7

Q11 Mathematics

If 6 machines can manufacture 480 components in 8 hours, how many components can 10 machines manufacture in 12 hours, assuming all machines work at the same constant rate?

A. 1200 ✓
B. 1440
C. 900
D. 1000

Q12 Mathematics

If x = asinθ and y = acosθ, then find the relation between x, y and a.

A. x2 + y2 = -a2
B. x2 - y2 = -a2
C. x2 - y2 = a2
D. x2 + y2 = a2 ✓

Q13 Mathematics

What is the ratio between fourth proportional of 10, 80, 30 and fourth proportional of 7, 28, 19?

A. 60:19 ✓
B. 10:7
C. 30:19
D. 29:26

Q14 Mathematics

What is the maximum value that must be assigned to A so that the 8-digit number 588A9792 is divisible by 4?

A. 5
B. 7
C. 9 ✓
D. 6

Q15 Mathematics

Four years ago from now, the average age of Amit, Bharat and Chitra was 36 years. Six years ago from now, the average age of Amit and Bharat was 30 years. What was the age of Chitra three years ago from now?

A. 42 years
B. 43 years
C. 40 years
D. 45 years ✓

Q16 Mathematics

What is the diameter of a circle if the numerical value of its area is equal to twice the numerical value of its perimeter?

A. 8 units ✓
B. 2 units
C. 6 units
D. 4 units

Q17 Mathematics

There are 75 members in group A, 47 members in group B and 15 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹493, ₹397 and ₹465, respectively. The overall average amount (in ₹) spent per member is:

A. 457 ✓
B. 461
C. 462
D. 455

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Q18 Mathematics

A dealer buys two articles X and Y for ₹500 each. He marks each of them at the same price. He sells X by giving two successive discounts of 20% and 45% and still earns ₹636 as profit. If he sells Y at a single discount of 67%, then what is the profit percentage on Y?

A. 70%

B. 70.4% ✓

C. 69.4%

D. 69%

Q19 Mathematics

The population of a village was 2,90,000. It increased by 15% in the first year and increased by 25% in the second year. Its population after two years is _____.

A. 3,62,500

B. 4,16,875 ✓

C. 3,33,500

D. 4,06,000

Q20 Mathematics

The following table shows the distribution of marks obtained by students in a test.

Marks Range	0-10	10-20	20-30	30-40	40-50
Number of Students	5	12	18	25	10

Find the mode. (Round off to two decimal places.)

A. 33.65

B. 32.56

C. 33.18 ✓

D. 32.84

Q21 Mathematics

Two automated lab machines start a calibration cycle at the same time.

- Machine A completes one cycle every **12 minutes.**
- Machine B completes one cycle every **18 minutes.**

After how many minutes will **both machines complete a cycle together again?**

A. 30

B. 48

C. 24

D. 36 ✓

Q22 Mathematics

$$\left(\frac{16}{5}\right)^{13} \times \left(\frac{5}{16}\right)^{16} \times \left(\frac{16}{5}\right)^{5} = \left(\frac{5}{16}\right)^{6m+16}$$

A. -1

B. 9

C. -3 ✓

D. 6

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Q23 Mathematics

Walking at $\frac{3}{7}$ of his normal speed from his home, Lakshya is 20 minutes late in reaching his office.

The usual time taken by him to cover the distance between his home and his office is

A. 13 minutes

B. 15 minutes ✓

C. 5 minutes

D. 11 minutes

Q24 Mathematics

Find the minimum value of the quadratic expression $7x^2 - 7x + 22$.

A. $\frac{81}{4}$ ✓

B. $\frac{83}{4}$

C. $\frac{55}{4}$

D. $\frac{65}{4}$

Q25 Mathematics

How many solutions for given three unknowns are possible to satisfy all these equations?

$-3\alpha + 2\beta + -5\gamma = -14$

$2\alpha - 3\beta + 4\gamma = 10$

$\alpha + \beta + \gamma = 4$

A. Two solutions

B. Unique solution

C. No solution

D. Infinite solutions ✓

Q26 Mathematics

If $x + \frac{1}{x} = -3$, find the value of $x^3 + \frac{1}{x^3}$.

A. 0

B. −3

C. 9

D. −18 ✓

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Q27 Mathematics

By selling an article at $\frac{2}{5}$ of its actual selling price, Akash incurs a loss of 24%.

If he sells it at 84% of its actual selling price, then the profit percentage is

A. 58.3%

B. 59.6% ✓

C. 57.8%

D. 61.6%

Q28 Mathematics

$$If\ 34\%\ of\ 50\ -\frac{4}{6}\times\sqrt[3]{512}\times\sqrt{36}=y,\ then\ the\ value\ of\ y\ is$$

A. -10

B. -12

C. -18

D. -15 ✓

Q29 Mathematics

$\left(\text{Take } \pi=\frac{22}{7}\right)$

A. $\sqrt{\frac{962}{33}}$

B. $\sqrt{\frac{968}{33}}$

C. $\sqrt{\frac{946}{33}}$

D. $\sqrt{\frac{952}{33}}$ ✓

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Q30 Mathematics

Mr. X travelled 810 km, 492 km and 988 km at a speed of 30 km/hr, 12 km/hr and 38 km/hr, respectively. Find his average speed in km/hr.

A. $25\frac{20}{47}$

B. $24\frac{16}{47}$

C. $24\frac{18}{47}$

D. $24\frac{17}{47}$ ✓

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A shopkeeper fixes the marked price of an item 110% above its cost price. What percentage of discount on marked price should be allowed to gain 26%?

- A. 40% ✓
- B. 43%
- C. 38%
- D. 39%

Q2 Mathematics

In what duration (in years) will ₹6,000 fetch a simple interest of ₹1,080 at 6% per annum rate of interest?

- A. 3 ✓
- B. 4
- C. 2
- D. 6

Q3 Mathematics

Two parallel lines, L1 and L2, are cut by a transversal. If one of the interior angles on the same side of the transversal is 70°, what is the measure of the other interior angle on the same side of the transversal?

- A. 70°
- B. 110° ✓
- C. 120°
- D. 180°

Q4 Mathematics

For what values of k will the equation $x^2 + kx + 361 = 0$ have equal roots?

- A. ±36
- B. ±18
- C. ±19
- D. ±38 ✓

Q5 Mathematics

There are 48 members in group A, 46 members in group B and 36 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹477, ₹236 and ₹348, respectively. The overall average amount (in ₹) spent per member is:

- A. 351
- B. 356 ✓
- C. 360
- D. 355

Q6 Mathematics

The mean of 80 numbers was found to be 49. If at the time of calculation, two numbers were incorrectly taken as 69 and 74 instead of 92 and 83, then the correct mean is _____.

- A. 49.4 ✓
- B. 46.2
- C. 49.0
- D. 48.5

Q7 Mathematics

A car leaves place Z at 2 PM and moves towards place T which is at a distance of D km at a uniform speed. A bus leaves place T at 3 PM and moves towards place Z at a uniform speed. The speed of car is half of bus. If they meet 04:40 PM at a point which is 184 km away from Z. The value of D is:

- A. 423
- B. 414 ✓
- C. 405
- D. 420

Q8 Mathematics

In a cricket match, a team needs 300 runs in 50 overs to win. In the first 15 overs, the team scores at an average rate of 5 runs per over. In the next 15 overs, the scoring rate improves to 8 runs per over. In the following 10 overs, the rate drops to 4 runs per over. What should be the run rate per over required in the remaining overs to win the match?

- A. 7.5 runs per over
- B. 6.5 runs per over ✓
- C. 6.95 runs per over
- D. 6.75 runs per over

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Q9 Mathematics

Water is pouring into a cuboidal reservoir at the rate of 70 litres per minute. The volume of the reservoir is 168 m^3. Find the time (in hours) it will take to fill the reservoir.

- A. 40 ✓
- B. 25
- C. 35
- D. 30

Q10 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 83 pages?

- A. 1670
- B. 1650
- C. 1660 ✓
- D. 1665

Q11 Mathematics

Two trains are moving in opposite directions at speeds of 140 km/hr and 70 km/hr. The length of one train is 350 m. The time taken by them to cross each other is 11 seconds. The length (in m, rounded off to 2 decimal places) of the other train is:

- A. 288.08
- B. 291.67 ✓
- C. 293.51
- D. 289.34

Q12 Mathematics

Let ABC be a right-angled triangle such that ∠B = 90°. If tan A = 1, then find the value of cosec A sec A.

- A. 3
- B. 4
- C. 2 ✓
- D. 1

Q13 Mathematics

The mean proportion of 15 and 72.6 is:

- A. 28
- B. 32
- C. 36
- D. 33 ✓

Q14 Mathematics

Evaluate: 16 + 20 ÷ 5 - 3 × 3

- A. 13
- B. 11 ✓
- C. 14
- D. 10

Q15 Mathematics

Krish has ₹1407 with him. He divides this amount between his two sons, Veer and Nitin, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Veer's investment amounts to the same value after 14 years as Nitin's investment does after 15 years. How much (in ₹) did Krish give to Nitin?

- A. 520
- B. 737
- C. 670 ✓
- D. 837

Q16 Mathematics

9 : 81 :: 2.5 : x and 3 : 6 :: 5 : y. What is the ratio of x to y?

- A. 9 : 4 ✓
- B. 10 : 2
- C. 5 : 3
- D. 13 : 14

Q17 Mathematics

A and B complete a work in 21 days. If A alone can do it in 24 days, then B alone can do three-fourth of the same work in _____days.

- A. 132
- B. 140
- C. 168
- D. 126 ✓

Q18 Mathematics

The price of each article of type P, Q, and R is ₹280, ₹180 and ₹115, respectively. Rohit buys articles of each type in the ratio 4 : 2 : 7 for ₹6,855. How many articles of type Q did he purchase?

- A. 6 ✓
- B. 14
- C. 12
- D. 3

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Q19 Mathematics

20% of a number is more than 20% of 620 by 170. The number is:

A. 1320
B. 1470 ✓
C. 1520
D. 1570

Q20 Mathematics

In an election between two candidates, 86% of the registered voters cast their vote and 20% of the votes polled were found invalid. Winning candidate got 55% of the valid votes and won the election by a margin of 3010 votes. How many voters were registered?

A. 43750 ✓
B. 43760
C. 43770
D. 43740

Q21 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-2) × 7

A. -27 ✓
B. -29
C. -30
D. -26

Q22 Mathematics

The highest common factor (HCF) of two numbers is one-fifth of the first number and one-third of the second number. The HCF is a two-digit prime number. The HCF of three times the first number and five times the second number is a number which is the product of _____.

A. five prime numbers
B. four prime numbers
C. two prime numbers
D. three prime numbers ✓

Q23 Mathematics

A vendor bought oranges at the rate of 40 oranges for ₹220, and sold them at ₹98 per dozen. Find his profit or loss percent. (Round off to two decimal places.)

A. Profit 48.48% ✓
B. Loss 48.48%
C. Profit 28.56%
D. Loss 28.56%

Q24 Mathematics

At present, Vanraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 73 years, then Vanraj's present age (in years) is:

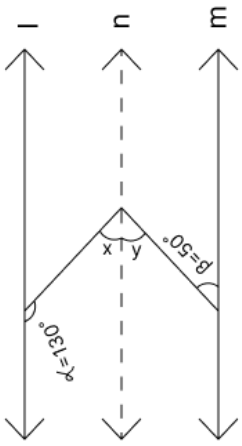
A. 51 ✓
B. 57
C. 53
D. 60

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Q25 Mathematics

In the given figure, lines l, m, and n are parallel to one another. Find the value of x + y.



A. 130°

B. 100° ✓

C. 110°

D. 80°

Q26 Mathematics

What is the value of (7x + 5y), if mean of the following distribution is 55?

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	4	19	x	5	y	64

A. 215

B. 224

C. 225

D. 214 ✓

Q27 Mathematics

A hemispherical tank filled with water is being emptied through a pipe at a rate of 115.5 litres per second.

If the tank has an internal radius of 31.5 m, determine the time required to drain 50% of the tank's water. (Use $\pi = \frac{22}{7}$)

A. 75 hours 48 minutes

B. 78 hours 45 minutes ✓

C. 78 hours 15 minutes

D. 78 hours 75 minutes

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Q28 Mathematics

If $a = \frac{1}{14}$, $b = \frac{1}{14}$ and $c = -\frac{1}{7}$, the value of $a^3 + b^3 + c^3$ is:

A. $\frac{1}{1372}$

B. $\frac{-1}{1372}$

C. $\frac{-3}{1372}$ ✓

D. $\frac{3}{1372}$

Q29 Mathematics

By selling an article at $\frac{2}{5}$ of its marked price, Aman incurs a loss of 21%.

If he sells it at 56% of its marked price, then the profit percentage is

A. 10.6% ✓

B. 11.6%

C. 12.8%

D. 12.1%

Q30 Mathematics

Simplify: $\frac{4.8 \times 0.36 \times 0.28}{0.08 \times 0.12}$

A. 50.2

B. 50.8

C. 50.6

D. 50.4 ✓

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

Find the mean proportional of 425 and 17.

A. 75
B. 85 ✓
C. 65
D. 95

Q2 Mathematics

There are 53 members in group A, 86 members in group B and 57 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹424, ₹337 and ₹122, respectively. The overall average amount (in ₹) spent per member is:

A. 302
B. 303
C. 297
D. 298 ✓

Q3 Mathematics

If 7 : 63 :: 6.5 : x and 7 : 42 :: 4 : y, then what is the ratio of x to y?

A. 43 : 26
B. 37 : 17
C. 40 : 14
D. 39 : 16 ✓

Q4 Mathematics

Piyush has ₹1407 with him. He divides this amount between his two sons, Manoj and Anand, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Manoj's investment amounts to the same value after 16 years as Anand's investment does after 17 years. How much (in ₹) did Piyush give to Anand?

A. 520
B. 837
C. 737
D. 670 ✓

Q5 Mathematics

Evaluate: (−9) − (−56) ÷ (−14) + (−2) × 9

A. −31 ✓
B. −34
C. −33
D. −30

Q6 Mathematics

What is the maximum value that must be assigned to A so that the 8-digit number 713A8845 is divisible by 3?

A. 7
B. 9 ✓
C. 6
D. 8

Q7 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 89 pages?

A. 1780 ✓
B. 1790
C. 1770
D. 1785

Q8 Mathematics

In an election between two candidates, 80% of the registered voters cast their vote and 20% of the votes polled were found invalid. Winning candidate got 55% of the valid votes and won the election by a margin of 368 votes. How many voters were registered?

A. 5750 ✓
B. 5747
C. 5751
D. 5749

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Q9 Mathematics

A cone has a base radius of 6 cm and a height of 7 cm. It is to be filled with water, and for every 180 cc of water poured into the cone, an additional 20 cc of water is spilled while pouring. If the spillage is proportional as described, how much water (in cc) will be required to fill the cone to its brim? (Use π = 22/7 and give your answer correct to two decimal places.)

A. 283.33

B. 295.67

C. 293.33 ✓

D. 296.67

Q10 Mathematics

P sells an item to Q at 50% profit. Q sells the same item to R at 32% loss. If R paid ₹ 5406 for the item, then at what price (in ₹) is the item purchased by P?

A. 5299

B. 5301

C. 5302

D. 5300 ✓

Q11 Mathematics

If the mode of a data exceeds its mean by 26.7, then the mode exceeds the median by _____. (Use empirical formula to find the answer)

A. 17.8 ✓

B. 8.5

C. 10.5

D. 12.4

Q12 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money double itself in 18 years on simple interest?

A. 7.56

B. 3.56

C. 5.56 ✓

D. 11.12

Q13 Mathematics

The monthly incomes of two friends Mohan and David, are in the ratio 6 : 7 respectively and each of them saves ₹69,000 every month. If the ratio of their monthly expenditure is 2 : 3, find the monthly income of Mohan (in ₹).

A. 1,03,500 ✓

B. 1,04,500

C. 1,44,900

D. 1,02,500

Q14 Mathematics

Two taps can fill a cistern in 4 hours and 28 hours respectively. A third tap can empty it in 28 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

A. 4

B. 2

C. 1 ✓

D. 3

Q15 Mathematics

A shopkeeper fixes the marked price of an item 140% above its cost price. What percentage of discount on marked price should be allowed to gain 68%?

A. 32%

B. 30% ✓

C. 29%

D. 28%

Q16 Mathematics

A car travels from City A to City B, a distance of 360 km. For the first half of the distance, it travels at a speed of 60 km/h. Due to traffic, it travels the next 120 km at 40 km/h. For the remaining distance, it travels at the same speed as it did for the first half. What is the average speed (in km/h) of the car for the entire trip, correct to two places after decimal?

A. 52.43 km/h

B. 50.43 km/h

C. 51.43 km/h ✓

D. 49.43 km/h

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Q17 Mathematics

What is the average of five consecutive even integers if the smallest integer is 28?

A. 30

B. 33

C. 32 ✓

D. 31

Q18 Mathematics

Two trains, Train A and Train B, are running on parallel tracks in the same direction. Train A, which is 150 metres long, is moving at 72 km/hr, while Train B, which is 120 metres long, is moving at 54 km/hr. How long will it take for Train A to completely overtake Train B?

A. 52 seconds

B. 58 seconds

C. 50 seconds

D. 54 seconds ✓

Q19 Mathematics

Which of the values of a, b, c given in the options satisfy the following equations?

$3a - 4b + 2c = -9$

$-4a + 4b + 10c = 32$

$-a + 2b - 7c = -7$

A. (1, 4, 2) ✓

B. (3, 2, 2)

C. (2, 1, 4)

D. (5, 1, 1)

Q20 Mathematics

If $a = 7 + 4\sqrt{3}$, then evaluate $(a^3 + \frac{1}{a^3})$.

A. $-1560\sqrt{3}$

B. -2702

C. $1560\sqrt{3}$

D. 2702 ✓

Q21 Mathematics

The area of a square is 8649 cm^2. Its perimeter is equal to the perimeter of a regular hexagon. What is the area (in cm^2) of the hexagon?

A. $5766\sqrt{3}$ ✓

B. $5762\sqrt{3}$

C. 5716

D. 5758

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Q22 Mathematics

If the mean proportional of two numbers is 14 and their third proportional is 112, then the numbers are:

A. 4,49

B. 4,44

C. 14,14

D. 7,28 ✓

Q23 Mathematics

If the mean of the following data is 41, then the value of X is:

xi	30	40	55	95
fi	31	X	50	17

A. 1281

B. 1277 ✓

C. 1298

D. 1293

Q24 Mathematics

$\left(\frac{13}{10}\right)^4 \times \left(\frac{10}{13}\right)^{16} \times \left(\frac{13}{10}\right)^{17} = \left(\frac{10}{13}\right)^{3m+18}$

A. $-\frac{29}{3}$

B. $-\frac{24}{3}$

C. $-\frac{33}{3}$

D. $-\frac{23}{3}$ ✓

Q25 Mathematics

By selling an article at $\frac{3}{10}$ of its actual selling price, Aman incurs a loss of 25%. If he sells it at 77% of its actual selling price, then the profit percentage is:

A. 90.6%

B. 92.6%

C. 91.4%

D. 92.5% ✓

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Q26 Mathematics

If ∠P, ∠Q, ∠R and ∠S of a quadrilateral PQRS, taken in order, are in the ratio 4:3:7:6, then quadrilateral PQRS will be of which type?

A. Parallelogram

B. Kite

C. Trapezium ✓

D. Rhombus

Q27 Mathematics

Find the maximum value of the quadratic expression $Ax^2 + Bx + C = 0$, where $A < 0$.

A. $\frac{AC - B^2}{4A}$

B. $\frac{4AC - B^2}{4}$

C. $\frac{4AC - B^2}{4A}$ ✓

D. $\frac{B^2 - AC}{4A}$

Q28 Mathematics

If $\text{cosec}A = \frac{5}{3}$, then find the value of $\frac{9(1 + \cot^2 A)}{80(1 - \sec A)(1 + \sec A)}$.

A. $\frac{-7}{9}$

B. $\frac{-5}{9}$ ✓

C. $\frac{5}{7}$

D. $\frac{3}{7}$

Q29 Mathematics

The HCF of two numbers is 6 and their LCM is 72. If one of the numbers is 18, find the other number.

A. 24 ✓

B. 36

C. 12

D. 48

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Q30 Mathematics

If the diameter of a circle is 14 cm, then what is the circumference of the circle?

$\left(\text{Use } \pi = \frac{22}{7}\right)$

A. 22 cm

B. 44 cm ✓

C. 24 cm

D. 36 cm

Blackbook

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

The number of ordered pair of positive integral solutions (a, b) such that the HCF of a and b is 28 and a + b = 868 is

A. 15
B. 30 ✓
C. 20
D. 25

Q2 Mathematics

During a sale 35% of the goods are sold at 22% profit, 40% of the remaining goods are sold at 37% profit and the still remaining goods are sold at a loss of 38%. If there is an overall profit of x%, then what is the value of x?

A. 6.8
B. 2.5 ✓
C. 5.4
D. 10.8

Q3 Mathematics

The common root of the equations $x^2 - 21x + 110 = 0$ and $110 + x - x^2 = 0$, is:

A. –11
B. 11 ✓
C. 10
D. –10

Q4 Mathematics

If a boat travels with a speed of 12 km/hr in still water and the speed of stream is 3 km/hr, what would be the time taken (in hours) by boat to go 60 km downstream?

A. 4 ✓
B. 5
C. 9
D. 6

Q5 Mathematics

A shopkeeper fixes the marked price of an item 100% above its cost price. What percentage of discount on marked price should be allowed to gain 2%?

A. 50%
B. 47%
C. 49% ✓
D. 48%

Q6 Mathematics

A shopkeeper purchased 52 dozens of articles at the rate of ₹400 per dozen. He sold each one of them at the rate of ₹58. What percentage profit did he make?

A. 74% ✓
B. 71%
C. 73%
D. 75%

Q7 Mathematics

A school employs trained and untrained teachers in the ratio 5 : 3. The salaries of a trained and an untrained teachers are in the ratio 4 : 1. If the total salary paid to all teachers in a month is ₹4,60,000, how much total salary is paid to the untrained teachers?

A. ₹45,000
B. ₹75,000
C. ₹1,20,000
D. ₹60,000 ✓

Q8 Mathematics

In what duration (in years) will ₹8,400 fetch a simple interest of ₹840 at 4% per annum rate of interest?

A. 5
B. 3.5
C. 1.5
D. 2.5 ✓

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Q9 Mathematics

There are 46 members in group A, 15 members in group B and 11 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹496, ₹106 and ₹406, respectively. The overall average amount (in ₹) spent per member is:

- A. 401 ✓
- B. 396
- C. 399
- D. 403

Q10 Mathematics

Subrata gets double the amount in 8 years when invested at compound interest, compounded annually. In how many years will the amount become eight times itself?

- A. 64
- B. 32
- C. 16
- D. 24 ✓

Q11 Mathematics

The ratio of the salaries of A and B is 4 : 5. If A's salary is increased by 20% and B's salary is decreased by 10%, what is the new ratio of their salaries?

- A. 13 : 12
- B. 14 : 13
- C. 15 : 14
- D. 16 : 15 ✓

Q12 Mathematics

What is the average of 7, 9 and 11?

- A. 10
- B. 7
- C. 8
- D. 9 ✓

Q13 Mathematics

In a business, A, B, and C invest in the ratio 3 : 5 : 4. Out of the total profit, B gives ₹15,000 to A such that A's share of the profit becomes equal to C's share. What is the total profit (in ₹) of the business?

- A. 1,50,000
- B. 1,20,000
- C. 1,80,000 ✓
- D. 2,40,000

Q14 Mathematics

A, B and C together can complete a certain work in 36 days. B and C together can complete the same work in 48 days. B is 75% more efficient than A. A, B and C work together for 15 days. B alone will complete the remaining work in:

- A. 51 days
- B. 44 days
- C. 48 days ✓
- D. 53 days

Q15 Mathematics

A boat moves at a speed of 7 km/h in still water. The boat goes 40 km downstream and then 40 km upstream. It is observed that the total time taken for this journey is 560 minutes less than the time it would take if the speed of the stream were 2 km/h faster. What is the initial speed (in km/h) of the stream?

- A. 4.5
- B. 3.5
- C. 4
- D. 3 ✓

Q16 Mathematics

The distance between two points on a map is 4 cm. The scale of the map is 1 : 829483. The actual distance between the two points (in km) is:
(Round off your answer to two decimal places.)

- A. 38.85
- B. 33.63
- C. 33.18 ✓
- D. 30.25

Q17 Mathematics

Girish scored 441 marks in an examination and was 75 marks short of 30% of maximum marks. In the same examination, his friend scored 688 marks. What is the percentage of marks scored by his friend?

- A. 42%
- B. 38%
- C. 44%
- D. 40% ✓

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Q18 Mathematics

A geological survey team has established three research stations forming a triangular monitoring zone. The stations are located at coordinates P(2,5), Q(8,1), and R(4,9) on a coordinate grid where each unit represents 1 kilometer. What is the area of the triangular monitoring zone?

A. 12 square kilometers

B. 14 square kilometers

C. 16 square kilometers ✓

D. 10 square kilometers

Q19 Mathematics

What is the median if the mode of distribution is 48 and the mean is 72?

A. 60

B. 54

C. 64 ✓

D. 62

Q20 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-4) × 8

A. -47

B. -48

C. -45 ✓

D. -44

Q21 Mathematics

A and B complete a work in 21 days. If A alone can do it in 28 days, then B alone can do three-fourth of the same work in _____days.

A. 56

B. 49

C. 63 ✓

D. 35

Q22 Mathematics

PQRS is a cyclic trapezium with PS parallel to QR. If ∠P = 85°, then the other three angles are:

A. ∠Q = 95°, ∠R = 95°, ∠S = 85° ✓

B. ∠Q = 85°, ∠R = 95°, ∠S = 95°

C. ∠Q = 85°, ∠R = 85°, ∠S = 95°

D. ∠Q = 95°, ∠R = 85°, ∠S = 95°

Q23 Mathematics

What is the value of $(7x + 6y)$, if mean of the following distribution is 50?

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	6	19	x	5	y	59

A. 200

B. 182

C. 190 ✓

D. 170

Q24 Mathematics

Which of the following is equivalent to the expression $\frac{1.2}{0.3} + \frac{2.4}{0.6}$?

A. 8 ✓

B. 6

C. 5

D. 4

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Q25 Mathematics

Solve the following system of linear equations:

$$-p + 2q - 3r = -9$$
$$p - 3q + r = 6$$
$$2p - 5q + 5r = 17$$

A. p = 1, q = 1, r = −2

B. p = 1, q = −1, r = 2 ✓

C. p = −1, q = 3, r = 2

D. p = −1, q = −1, r = 3

Q26 Mathematics

$$\left(\frac{17}{4}\right)^9 \times \left(\frac{4}{17}\right)^8 \times \left(\frac{17}{4}\right)^{15} = \left(\frac{4}{17}\right)^{5m+15}$$

A. $-\frac{32}{5}$

B. $-\frac{40}{5}$

C. $-\frac{39}{5}$

D. $-\frac{31}{5}$ ✓

Q27 Mathematics

In quadrilateral ABCD, the bisectors of $\angle A$ and $\angle B$ meet at O and $\angle AOB = 41°$. The value of $\angle C + \angle D$ is:

A. $41°$

B. $49°$

C. $82°$ ✓

D. $98°$

Q28 Mathematics

If $x + y + z = 10$, $x^2 + y^2 + z^2 = 38$, $5xyz = 150$ and $(xy + yz + zx) = 31$, then what is the value of $2(x^3 + y^3 + z^3)$?

A. 320 ✓

B. 160

C. 520

D. 260

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Q29 Mathematics

The volume of a cylindrical tank is 1584 cubic meters. If the height of the tank is 14 m, then find the diameter of the tank.

$\left(\text{Use } \pi = \frac{22}{7}\right)$

A. 9 m

B. 12 m ✓

C. 6 m

D. 18 m

Q30 Mathematics

In a park, there is a flagpole. A person standing 30 m away from the flagpole observes that the angle of elevation of the top of the flagpole is 30°. Determine the height (in metres) of the flagpole.

A. $20\sqrt{3}$

B. $10\sqrt{3}$ ✓

C. $40\sqrt{3}$

D. $30\sqrt{3}$

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

Find the mean proportional between 9 and 25.

A. 18
B. 15 ✓
C. 21
D. 12

Q2 Mathematics

What is the average of all the natural numbers from 1 to 64?

A. 32.5 ✓
B. 33
C. 33.5
D. 32

Q3 Mathematics

If x is inversely proportional to y, and y = 30 when x = 28, find the value of x, when y = 20.

A. 42 ✓
B. 52
C. 38
D. 33

Q4 Mathematics

If $x = \sqrt[3]{(31 + 14\sqrt{3})}$ and $y = \sqrt[3]{(31 - 14\sqrt{3})}$, then the value of $x^3 + y^3 + 3x^3y^3$ is

A. 1157
B. 1143
C. 1181 ✓
D. 1198

Q5 Mathematics

A dealer buys two articles X and Y for ₹1,000 each. He marks each of them at the same price. He sells X by giving two successive discounts of 15% and 30% and still earns ₹337 as profit. If he sells Y at a single discount of 49%, then what is the profit percentage on Y?

A. 13%
B. 14%
C. 14.6% ✓
D. 13.6%

Q6 Mathematics

Three friends X, Y and Z started a business by investing a sum of money in the ratio of 6 : 3 : 5. After 6 months, X withdraws half of his capital. If the sum invested by Z is ₹12,000, then out of a total annual profit of ₹69,000, what is the difference between X's and Y's profit?

A. ₹8280 ✓
B. ₹8120
C. ₹7290
D. ₹9910

Q7 Mathematics

Let ABCD be a quadrilateral which satisfies any of the following conditions.
(i) opposite sides are equal
(ii) each diagonal of ABCD divides it into congruent triangles
(iii) each pair of opposite angles are equal
(iv) diagonals of ABCD bisect each other
Then ABCD has to be a _____.

A. rectangle
B. trapezium
C. parallelogram ✓
D. kite

Q8 Mathematics

In an election between two candidates, 80% of the registered voters cast their vote and 15% of the votes polled were found invalid. Winning candidate got 75% of the valid votes and won the election by a margin of 289 votes. How many voters were registered?

A. 848
B. 852
C. 851
D. 850 ✓

Q9 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 87 pages?

A. 1740 ✓
B. 1750
C. 1730
D. 1745

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Q10 Mathematics

Ajay gets double the amount in 7 years when invested at compound interest, compounded annually. In how many years will the amount become sixteen times itself?

- A. 28 ✓
- B. 112
- C. 14
- D. 56

Q11 Mathematics

A woman travelled at a speed of 20 m/min for 90 min, and at a speed of 70 m/min for 60 min. Her average speed (in m/min) for the entire journey is:

- A. 40 ✓
- B. 46
- C. 33
- D. 44

Q12 Mathematics

At present, Vanraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 93 years, then Vanraj's present age (in years) is:

- A. 44
- B. 63 ✓
- C. 49
- D. 39

Q13 Mathematics

If a 7-digit number 56339A8 is completely divisible by 6, what is the minimum value of A?

- A. 5
- B. 3
- C. 1
- D. 2 ✓

Q14 Mathematics

20% of a number is more than 20% of 620 by 190. The number is:

- A. 1670
- B. 1620
- C. 1420
- D. 1570 ✓

Q15 Mathematics

There are 32 members in group A, 52 members in group B and 73 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹266, ₹470 and ₹168, respectively. The overall average amount (in ₹) spent per member is:

- A. 288 ✓
- B. 292
- C. 291
- D. 286

Q16 Mathematics

A shopkeeper purchased 21 dozens of articles at the rate of ₹150 per dozen. He sold each one of them at the rate of ₹78. What percentage profit did he make?

- A. 525%
- B. 523%
- C. 524% ✓
- D. 526%

Q17 Mathematics

Let C be a circle with centre O and radius 21 cm. Let OAB be a sector of C. If the area of the sector is 385 cm^2, then find the angle made by the sector at O.
(Use π = 22/7.)

- A. 120°
- B. 60°
- C. 100° ✓
- D. 80°

Q18 Mathematics

A shopkeeper professes to sell his goods at a 60% loss but uses a false balance and gains 70%. The actual weight (rounded off to one decimal place) that he uses instead of 1 kg is:

- A. 230.9 gm
- B. 239.8 gm
- C. 241.3 gm
- D. 235.3 gm ✓

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Q19 Mathematics

P and Q are two stations. A train travels from P to Q at a speed of 144 km/h and returns to P at a slower speed. If the average speed for the entire journey is 126 km/h, find the speed at which the train returns.

A. 124 km/h

B. 128 km/h

C. 112 km/h ✓

D. 121 km/h

Q20 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 18 years on simple interest?

A. 22.22 ✓

B. 20.22

C. 24.22

D. 44.44

Q21 Mathematics

If 4 lines of a print, in a column of a book, contain 36 words, how many words will a column of 93 lines contain?

A. 841

B. 837 ✓

C. 847

D. 833

Q22 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-3) × 6

A. -33

B. -30

C. -34

D. -31 ✓

Q23 Mathematics

Which of the following is equivalent to a quadratic equation?

A. $(x^2+1)^2-x^4=2x+1$ ✓

B. $\frac{x}{x-1}+\frac{2x}{x-1}=3$

C. $\frac{(x^2-1)}{(x+1)}=x-2$

D. $x^3-3x^2+3x-1=(x-1)^3$

Q24 Mathematics

The sum of two numbers a and b, where a < b, is 129. The HCF and LCM of a and b are 3 and 1350, respectively.

Find the value of $\frac{1}{a}-\frac{1}{b}$.

A. $\frac{7}{1350}$ ✓

B. $\frac{-3}{4550}$

C. $\frac{-21}{1550}$

D. $\frac{441}{450}$

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Q25 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

A. $\frac{\text{cosec}\theta - 1}{\text{cosec}\theta + 1}$ ✓

B. $\frac{\sec\theta - 1}{\sec\theta + 1}$

C. $\frac{\sec\theta + 1}{\sec\theta - 1}$

D. $\frac{\text{cosec}\theta + 1}{\text{cosec}\theta - 1}$

Q26 Mathematics

If the mean of the following data is 40, find the value of X.

Class	10-20	20-30	30-40	40-50	50-60
Frequency	42	19	23	26	X

A. 88 ✓

B. 79

C. 40

D. 38

Q27 Mathematics

The area of a square is 3969 cm^2. Its perimeter is equal to the perimeter of a regular hexagon. What is the area (in cm^2) of the hexagon?

A. 2600

B. 2608

C. $2646\sqrt{3}$ ✓

D. $2662\sqrt{3}$

Q28 Mathematics

If $8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + Exy)$, then the value of $(A + B + C + D + E)$ is:

A. 2

B. 0 ✓

C. −3

D. −1

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Q29 Mathematics

The following table shows the distribution of marks obtained by 100 students in a test.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of Students	5	9	14	22	30	20

The median marks is:

A. 38.8

B. 40.0 ✓

C. 42.2

D. 39.2

Q30 Mathematics

A conical open packet is made from a rectangular sheet of paper of length 66 cm and breadth 30 cm. The height of the packet is as large as possible and the length of the rectangle forms the circumference of the base of the conical packet. The conical packet is stapled at a height of 2 cm from the vertex of the cone, to avoid spilling of items inside it. Find the volume (in cm^3) of the packet, rounded off to the nearest whole number.

$(\text{Use } \pi = \frac{22}{7})$

A. 3296

B. 3464 ✓

C. 3638

D. 3582

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

Two parallel lines L1 and L2 are cut by a transversal. If one of the alternate interior angles is 65°, what is the measure of the corresponding alternate interior angle?

A. 110°
B. 90°
C. 180°
D. 65° ✓

Q2 Mathematics

A shopkeeper buys 45 identical calculators for ₹54,000. He sells 30 of them at a profit of 25% and the remaining at a loss of 20%. What is the overall profit or loss percentage?

A. 10% profit ✓
B. 5% loss
C. 10% loss
D. 5% profit

Q3 Mathematics

The population of a village was 2,90,000. It increased by 5% in the first year and increased by 30% in the second year. Its population after two years is _____.

A. 3,77,000
B. 3,91,500
C. 3,04,500
D. 3,95,850 ✓

Q4 Mathematics

If a : b = 1 : 3, b : c = 5 : 7 and c : d = 9 : 5, then the value of a : b : c : d is:

A. 25 : 75 : 105 : 45
B. 5 : 75 : 105 : 35
C. 15 : 75 : 105 : 35
D. 15 : 45 : 63 : 35 ✓

Q5 Mathematics

There are ₹5, ₹2, and ₹1 coins amounting to a total of ₹212. The total number of coins is 112. The number of ₹2 coins is 50 more than the number of ₹5 coins. Find the number of ₹1 coins.

A. 42 ✓
B. 50
C. 10
D. 25

Q6 Mathematics

At what rate (in percentage, rounded off to two decimal place) per year will a sum of money 5 times itself in 12 years on simple interest?

A. 33.33 ✓
B. 35.33
C. 31.33
D. 66.66

Q7 Mathematics

A shopkeeper fixes the marked price of an item 150% above its cost price. What percentage of discount on marked price should be allowed to gain 60%?

A. 33%
B. 36% ✓
C. 34%
D. 39%

Q8 Mathematics

Four classes have a ratio of boys to girls as 4 : 5, 3 : 2, 6 : 5 and 5 : 6, respectively. Which class has a higher proportion of boys?

A. Fourth class (5 : 6)
B. Third class (6 : 5)
C. Second class (3 : 2) ✓
D. First class (4 : 5)

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Q9 Mathematics

The minimum value of the expression max $\{p^2 - 2p + 4, -p^2 + 2p - 4\}$ in the range $0 \le p \le 1$ is:

A. 2

B. 3 ✓

C. 4

D. 1

Q10 Mathematics

Two taps can fill a cistern in 4 hours and 32 hours respectively. A third tap can empty it in 32 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

A. 3

B. 1 ✓

C. 4

D. 2

Q11 Mathematics

There are 39 members in group A, 33 members in group B and 52 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹377, ₹401 and ₹233, respectively. The overall average amount (in ₹) spent per member is:

A. 323 ✓

B. 324

C. 328

D. 325

Q12 Mathematics

Amit invested equal amounts at simple interest and compound interest, compounded annually, for 2 years at the same rate of 4% per annum. In the end, he found a difference of ₹53 between the two interests earned. What was the amount (in ₹) invested in each case?

A. 32375

B. 33475

C. 32225

D. 33125 ✓

Q13 Mathematics

Let ABC be a right-angled triangle such that ∠B = 90°, AB = 12 cm and AC = 13 cm. Find the value of tan A - cot C.

A. 5

B. 0 ✓

C. 6

D. 2

Q14 Mathematics

What is the average of all the natural numbers from 1 to 60?

A. 30

B. 31

C. 30.5 ✓

D. 31.5

Q15 Mathematics

Chetan's salary is ₹18000 per month. He spends ₹5000 on house rent, ₹2000 on bills and the rest of the amount is his monthly savings. Find his savings (in ₹) in a year, if in the month of his birthday, he spent his complete monthly saving for birthday celebration.

A. 110000

B. 121000 ✓

C. 132000

D. 99000

Q16 Mathematics

Two pipes can fill a tank in 4 hours and 24 hours, respectively. A third pipe can empty the tank in 6 hours. If all three pipes are opened together, how long (in hours) will it take to fill half of the empty tank?

A. 2 hours

B. 4 hours ✓

C. 6 hours

D. 3 hours

Q17 Mathematics

What is the maximum value that must be assigned to A so that the 8-digit number 445A0208 is divisible by 3?

A. 9

B. 2

C. 7 ✓

D. 5

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Q18 Mathematics

A shopkeeper professes to sell his goods at a 20% loss but uses a false balance and gains 40%. The actual weight (rounded off to one decimal place) he uses for 1 kg is:

A. 576.7 gm

B. 568.8 gm

C. 575.4 gm

D. 571.4 gm ✓

Q19 Mathematics

A boat travels 120 km downstream in 6 hours and 120 km upstream in 10 hours. The speed of the current is 4 km/hr. What is the speed of the boat in still water?

A. 16 km/hr ✓

B. 10 km/hr

C. 8 km/hr

D. 14 km/hr

Q20 Mathematics

Simplify: $\frac{(4.23)^3 - 0.69 \times (4.23)^2 + 12.69(0.23)^2 - (0.23)^3}{0.4 \times 0.4 \times 4}$

A. 1000

B. 1

C. 100 ✓

D. 10

Q21 Mathematics

Calculate the mode for the following frequency distribution of marks obtained by students in an exam. (Rounded off to two decimal places)

Marks	0-10	10-20	20-30	30-40	40-50
Number of Students	8	16	36	34	16

A. 31.25

B. 28.45

C. 29.09 ✓

D. 30.15

Q22 Mathematics

Find the volume of largest possible sphere that can be inscribed in a cone whose base radius is 42√3 cm and slant height equal to the diameter of the base. (Use $\pi = \frac{22}{7}$)

A. 310464 cm3 ✓

B. 314064 cm3

C. 314046 cm3

D. 301644 cm3

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Q23 Mathematics

Ankur jogs on a circular track X at $1\frac{2}{3}$ m/s and Mahima jogs on track Y at $2\frac{1}{12}$ m/s. The total length of Tracks X and Y is 0.325 km. Ankur makes 9 rounds of track X in the same time Mahima makes 5 rounds of track Y. The time taken (in seconds) by Mahima to complete one round of track X is:

A. 48 ✓

B. 39

C. 35

D. 42

Q24 Mathematics

What is the mode of the data given below? [Give your answer correct to 2 decimal places.]

Age in years	15-25	25-35	35-45	45-55	55-65	65-75	75-85
No. of patients	18	10	15	14	30	40	34

A. 69.25

B. 72.25

C. 71.25 ✓

D. 70.25

Q25 Mathematics

Find the volume (in cm^3) of a sphere having a diameter of 37.8 cm, giving your answer correct to two places of decimal.

$take\ \pi = \frac{22}{7}$

A. 28291.03 ✓

B. 28281.03

C. 28311.03

D. 28301.03

Q26 Mathematics

The least common multiple of $x^{3.5} \times y^{1.5}$, $\frac{y^{2.5}}{x^{-4.5}}$, and $\frac{x}{y^{-3}}$ is:

A. $(xy)^2\sqrt{x^3}$

B. $(xy)^3\sqrt{x^3}$ ✓

C. $(xy)^2\sqrt{y^3}$

D. $(xy)^3\sqrt{y^3}$

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Q27 Mathematics

$$\frac{\sqrt[3]{2197}}{\sqrt[4]{10000}} \times \frac{5}{39} \times 48 = ?$$

A. 4

B. 16

C. 8 ✓

D. 2

Q28 Mathematics

A chemical research laboratory uses three compounds A, B, and C in the cost ratio 3 : 5 : 7. When a fourth compound D is added to the mixture, the total cost increases by 40%. If the new ratio becomes A : B : C : D = 3 : 5 : 7 : x, what is the value of x?

A. 8

B. 6 ✓

C. 4

D. 9

Q29 Mathematics

Two lines AB and CD are parallel. Let PQ be the transversal intersecting AB at M and CD at N. If $\angle MND = 47^\circ$, find $\angle AMN$.

A. 107°

B. 133°

C. 47° ✓

D. 73°

Q30 Mathematics

If $(125)^{1.3} \times (25)^{1.8} \div (5)^{2.5} = 5^x$, then find the value of $18x - 5$.

A. 80

B. 90

C. 85 ✓

D. 95

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

Two pipes can fill a cistern in 24 minutes and 36 minutes, respectively. A third pipe can empty it in 18 minutes. If all three are opened together, how long will it take to fill the tank?

- A. 108 minutes
- B. 144 minutes
- C. 60 minutes
- D. 72 minutes ✓

Q2 Mathematics

100 men have provisions for 26 days. If 48 men have left, for how many days the same provisions would last for the remaining men?

- A. 50 ✓
- B. 54
- C. 52
- D. 48

Q3 Mathematics

The standard deviation of 7 consecutive integers with mean 0 is _____.

- A. 0
- B. 2 ✓
- C. 1
- D. 3

Q4 Mathematics

Evaluate: 16 + 18 ÷ 6 - 3 × 3

- A. 13
- B. 10 ✓
- C. 12
- D. 9

Q5 Mathematics

If A's salary is 130% more than that of B, then by how much percent is B's salary less than that of A (correct to 2 decimal places)?

- A. 58.42%
- B. 55.88%
- C. 56.52% ✓
- D. 54.62%

Q6 Mathematics

The length, breadth and height of a room are 20m, 10m and 6m, respectively. If the rate of painting the four walls and the ceiling of the room is ₹15/square metre, then find the total cost.

- A. ₹9200
- B. ₹7200
- C. ₹8400 ✓
- D. ₹6500

Q7 Mathematics

The price of each article of type P, Q, and R is ₹280, ₹180 and ₹120, respectively. Subrata buys articles of each type in the ratio 3 : 2 : 3 for ₹6,240. How many articles of type Q did he purchase?

- A. 8 ✓
- B. 14
- C. 16
- D. 5

Q8 Mathematics

The sum of 12 numbers is 528. Find their average.

- A. 45
- B. 44 ✓
- C. 42
- D. 43

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Q9 Mathematics

20% of a number is more than 20% of 620 by 200. The number is:

A. 1670
B. 1620 ✓
C. 1470
D. 1720

Q10 Mathematics

A shopkeeper fixes the marked price of an item 100% above its cost price. What percentage of discount on marked price should be allowed to gain 88%?

A. 5%
B. 4%
C. 6% ✓
D. 3%

Q11 Mathematics

The ratio of the ages of two persons, P and Q, is 3 : 4. After 6 years, the ratio of their ages will become 4 : 5. What is the present age of P?

A. 30 years
B. 13 years
C. 20 years
D. 18 years ✓

Q12 Mathematics

There are 21 members in group A, 11 members in group B and 17 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹465, ₹410 and ₹466, respectively. The overall average amount (in ₹) spent per member is:

A. 453 ✓
B. 452
C. 454
D. 455

Q13 Mathematics

A woman travelled at a speed of 20 m/min for 90 min, and at a speed of 65 m/min for 60 min. Her average speed (in m/min) for the entire journey is:

A. 42
B. 38 ✓
C. 44
D. 31

Q14 Mathematics

Find the area of an equilateral triangle with side 8 cm (correct to 2 decimal places).

A. 26.61 sq. cm.
B. 27.71 sq. cm. ✓
C. 29.91 sq. cm.
D. 24.41 sq. cm.

Q15 Mathematics

Amit invested equal amounts at simple interest and compound interest, compounded annually, for 2 years at the same rate of 4% per annum. In the end, he noticed a difference of ₹52 between the two interests earned. What was the amount (in ₹) invested in each case?

A. 32500 ✓
B. 31600
C. 32850
D. 31750

Q16 Mathematics

P sells an item to Q at 77% profit. Q sells the same item to R at 50% loss. If R paid ₹ 2655 for the item, then at what price (in ₹) is the item purchased by P?

A. 3002
B. 3000 ✓
C. 3001
D. 3003

Q17 Mathematics

A bag contains coins of ₹1, ₹2, and ₹5 in the ratio 8 : 4 : 3. If the total value of the coins is ₹930, what is the total number of coins in the bag?

A. 400
B. 480
C. 420
D. 450 ✓

Q18 Mathematics

Let C be a circle with centre O and AB be a minor arc on C. Let S be a point on the minor arc AB. If AB subtends an angle 120° at O, then find the measure of ∠ASB.

A. 120° ✓
B. 60°
C. 110°
D. 100°

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Q19 Mathematics

The areas of two similar triangles are 841 cm^2 and 676 cm^2, respectively. What is the ratio of their corresponding altitudes?

A. 38 : 27

B. 24 : 28

C. 29 : 26 ✓

D. 27 : 24

Q20 Mathematics

A tourist covers his 120 km journey in three stages. In the first stage, he travels at a speed of x km/hr. In the second stage, he increases his speed by 50%. In the third stage, he reduces his second-stage speed by 20%. He spends equal time on all the 3 stages, and his average speed for the entire journey is 48 km/hr. Find the value of x correct to one decimal place.

A. 39.3

B. 38.3

C. 40.3

D. 38.9 ✓

Q21 Mathematics

Find the number of possible values for a natural number N such that the LCM of 120 and N is 360, and the HCF of 900 and N is 90.

A. 4

B. 2

C. 1 ✓

D. 3

Q22 Mathematics

At what rate per annum will a sum of money become five times itself in 10 years under simple interest?

A. 80%

B. 42%

C. 40% ✓

D. 38%

Q23 Mathematics

into a vulgar fraction.

A. $\frac{1}{15}$

B. $\frac{4}{15}$ ✓

C. $\frac{7}{15}$

D. $\frac{2}{15}$

Q24 Mathematics

If $x^4 - 83x^2 + 1 = 0$ and $x > 0$, then the value of $\sqrt{x^3 - x^{-3} + 28}$ is:

A. 29

B. 27

C. 28 ✓

D. 26

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Q25 Mathematics

Let ABC be a right-angled triangle such that ∠B = 90°, ∠ACB = 30° and AB = 5 cm. Find the value (in cm) of AC + BC.

A. $5\sqrt{3}$

B. $12\sqrt{3}$

C. $10 + 5\sqrt{3}$ ✓

D. $10 + 2\sqrt{3}$

Q26 Mathematics

By selling an article at $\frac{3}{10}$ of its marked price, Hitesh incurs a loss of 16%.

If he sells it at 69% of its marked price, then the profit percentage is

A. 93.2% ✓

B. 95.7%

C. 93.8%

D. 94.8%

Q27 Mathematics

Find the value of y, satisfying $19 \times 7 \times 630 \div \sqrt{2025} = y + 517$

A. 1348

B. 1345 ✓

C. 1340

D. 1335

Q28 Mathematics

Find the difference between the values of 'm' for which $2m = 5\sqrt{m} - 2$.

A. $\frac{15}{4}$ ✓

B. $2\sqrt{2}$

C. $2\sqrt{3}$

D. $\frac{8}{3}$

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Q29 Mathematics

The mode of the following data is 36. Find the missing frequency in it.

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	4	6	--	9	5

A. 4

B. 6

C. 3 ✓

D. 5

Q30 Mathematics

Find the solution of the following system of linear equations:

$x + 4y + 2z = 12$
$2x - y + z = 3$
$x + y - z = 0$

A. $\frac{5}{2}\ \frac{3}{2}$

B. $\frac{3}{2}\ \frac{5}{2}$ ✓

C. $\frac{3}{2}\ \frac{5}{2}$

D. $\frac{5}{2}\ \frac{3}{2}$

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A man can row at 8 km/hr in still water. When the river flows at 2 km/hr, he takes 3 hours 12 minutes to row to a destination and back. Find the distance to the destination.

- A. 15 km
- B. 8 km
- C. 12 km ✓
- D. 10 km

Q2 Mathematics

If the mode of a data exceeds its mean by 33.6, then the mode exceeds the median by _____. (Use empirical formula to find the answer.)

- A. 23.8
- B. 22.4 ✓
- C. 20.6
- D. 19.5

Q3 Mathematics

At what rate (in percentage) per year will a sum of money double itself in 20 years on simple interest?

- A. 5 ✓
- B. 10
- C. 3
- D. 7

Q4 Mathematics

A shopkeeper purchased 32 dozens of articles at the rate of ₹102 per dozen. He sold each one of them at the rate of ₹68. What percentage profit did he make?

- A. 700% ✓
- B. 697%
- C. 702%
- D. 701%

Q5 Mathematics

If 8, x and 18 are in continued proportion, find the value of x.

- A. 8
- B. 18
- C. 12 ✓
- D. 14

Q6 Mathematics

What will be the positive difference in the population of a town 3 years ago and 2 years ago, if its current population is 450000 and the population has been increasing at a rate of 25% every year?

- A. 57600 ✓
- B. 56850
- C. 57050
- D. 57950

Q7 Mathematics

In a 150-meter race, R beats S by 6 meters. In a 250-meter race, R beats S by 2 seconds. As per this, in a race, if R runs for 30 seconds, then he beats S by ___ meters.

- A. 6.25 ✓
- B. 5.75
- C. 7.25
- D. 6.75

Q8 Mathematics

Girish scored 768 marks in an examination and was 60 marks short of 92% of maximum marks. In the same examination, his friend scored 738 marks. What is the percentage of marks scored by his friend?

- A. 80%
- B. 79%
- C. 81%
- D. 82% ✓

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Q9 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-2) × 6

- A. -25 ✓
- B. -28
- C. -24
- D. -27

Q10 Mathematics

A trader gives 5% discount on the marked price of an article and gives 2 articles free for buying 14 articles and gains 33% in the entire transaction. Assuming a customer pays for 14 articles, the marked price of an article is what percent more than its cost price?

- A. 58%
- B. 52%
- C. 68%
- D. 60% ✓

Q11 Mathematics

The population of a village was 2,90,000. It increased by 15% in the first year and increased by 20% in the second year. Its population after two years is _____.

- A. 3,33,500
- B. 3,91,500
- C. 4,00,200 ✓
- D. 3,48,000

Q12 Mathematics

If 2820 is divided into two parts such that one-fifth of the first part and one-eighth of the second part are in the ratio 3 : 4, what is the ratio of the first part to the second part?

- A. 18 : 19
- B. 15 : 32 ✓
- C. 15 : 37
- D. 17 : 36

Q13 Mathematics

A and B complete a work in 20 days. If A alone can do it in 45 days, then B alone can do three-fourth of the same work in _____days.

- A. 108
- B. 54
- C. 81
- D. 27 ✓

Q14 Mathematics

The larger of two supplementary angles is 32° more than the smaller. The smaller angle (in degree) is:

- A. 74 ✓
- B. 76
- C. 81
- D. 75

Q15 Mathematics

There are 16 members in group A, 86 members in group B and 21 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹447, ₹396 and ₹158, respectively. The overall average amount (in ₹) spent per member is:

- A. 360
- B. 367
- C. 362 ✓
- D. 366

Q16 Mathematics

The marks obtained by 11 students in a mathematics test are as follows: 45, 62, 58, 71, 66, 54, 60, 49, 68, 57, 63. What is the median marks?

- A. 60 ✓
- B. 66
- C. 54
- D. 58

Q17 Mathematics

Two concentric circles have radii of 15 cm and 17 cm. Find out the length of the chord of the larger circle that is tangent to the smaller circle.

- A. 24 cm
- B. 16 cm ✓
- C. 30 cm
- D. 8 cm

Q18 Mathematics

The average of three numbers is 20. If two numbers are 13 and 22, the third number is:

- A. 25 ✓
- B. 26
- C. 24
- D. 27

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Q19 Mathematics

Three friends X, Y and Z started a business by investing a sum of money in the ratio of 9 : 5 : 2. After 6 months, X withdraws half of his capital. If the sum invested by Z is ₹83,000, then out of a total annual profit of ₹88,000, what is the difference between X's and Y's profit?

A. ₹10,945

B. ₹11,200 ✓

C. ₹12,710

D. ₹10,550

Q20 Mathematics

Find the value of y, satisfying $18 \times 7 \times 560 \div \sqrt{3136} = y + 703$

A. 559

B. 556

C. 567

D. 557 ✓

Q21 Mathematics

y

A. $y(xy)^2$, y

B. $y(xy)^2$, 1

C. $x(xy)^2$, 1 ✓

D. $x(xy)^2$, x

Q22 Mathematics

Pipe P can fill $\frac{5}{9}$ part of a tank in 15 hours and pipe Q can fill $\frac{7}{9}$ part of the same tank in 21 hours. Both P and Q were kept open for 3 hours, then both were closed. Pipe R alone was then opened and it emptied the water in the tank in 4 hours. Pipes P, Q and R together can fill the empty tank in:

A. 58 hours

B. 57 hours

C. 42 hours

D. 54 hours ✓

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Q23 Mathematics

What is the nature of the roots of the following quadratic equation?

$$x - \frac{1}{x} = 17$$

- **A.** Real and distinct (irrational) ✓
- **B.** Real and equal
- **C.** No real roots
- **D.** Real and distinct (rational)

Q24 Mathematics

(Take $\pi = \frac{22}{7}$)

- **A.** $\sqrt{\frac{1966}{66}}$
- **B.** $\sqrt{\frac{1967}{66}}$ ✓
- **C.** $\sqrt{\frac{1957}{132}}$
- **D.** $\sqrt{\frac{1965}{66}}$

Q25 Mathematics

Solve the following system of linear equations:

$$u + v + w = 2$$
$$6u + 4v + 5w = 31$$
$$5u + 2v + 2w = 13$$

- **A.** u = 3, v = −18, w = 17 ✓
- **B.** u = 1, v = 15, w = −14
- **C.** u = 1, v = 18, w = −17
- **D.** u = 3, v = −15, w = 14

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Q26 Mathematics

If $(5x-1)^3+(x+3)^3+8(3x-4)^3=6(5x-1)(x+3)(3x-4)$, then the value of x is:

A. $\frac{3}{4}$

B. $\frac{3}{5}$

C. $\frac{1}{2}$ ✓

D. $\frac{1}{4}$

Q27 Mathematics

The number 22.121212.... in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$ is:

A. $\frac{720}{33}$

B. $\frac{740}{33}$

C. $\frac{730}{33}$ ✓

D. $\frac{710}{33}$

Q28 Mathematics

Simplify: $\frac{\cos\theta}{1+\sin\theta}+\frac{1+\sin\theta}{\cos\theta}$.

A. 2 cosθ

B. 2 secθ ✓

C. 2 sinθ

D. 2 cosecθ

Q29 Mathematics

A right circular cone has a slant height that is 3 times its radius. A plane cuts the cone parallel to the base at a height such that the smaller, upper cone has half the curved surface area of the original cone. If the diameter of the smaller cone is $6\sqrt{2}$ cm, then what is the radius (in cm) of the original cone?

A. 12

B. 3

C. 6 ✓

D. 9

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Q30 Mathematics

By selling an article at $\frac{3}{10}$ of its marked price, Aman incurs a loss of 25%.

If he sells it at 69% of its actual marked price, then the profit percentage is

A. 72.5% ✓

B. 74.1%

C. 75.1%

D. 73.5%

Blackbook

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

In an election between two candidates, 90% of the registered voters cast their vote and 20% of the votes polled were found invalid. Winning candidate got 51% of the valid votes and won the election by a margin of 3870 votes. How many voters were registered?

A. 268730
B. 268760
C. 268720
D. 268750 ✓

Q2 Mathematics

Evaluate: 16 + 20 ÷ 4 - 3 × 4

A. 11
B. 8
C. 12
D. 9 ✓

Q3 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 90 pages?

A. 1790
B. 1800 ✓
C. 1810
D. 1805

Q4 Mathematics

Five circles are placed adjacent to one another and have lines M1 and M2 as their common tangents. If the radius of the largest circle is 9 units and that of the smallest circle is 4 units, then what is the radius of the middle circle (in units)?

A. 5
B. 6 ✓
C. 8
D. 10

Q5 Mathematics

100 men have provisions for 27 days. If 40 men have left, for how many days the same provisions would last for the remaining men?

A. 43
B. 45 ✓
C. 47
D. 49

Q6 Mathematics

P sells an item to Q at 40% profit. Q sells the same item to R at 50% loss. If R paid ₹ 6895 for the item, then at what price (in ₹) is the item purchased by P?

A. 9852
B. 9849
C. 9850 ✓
D. 9848

Q7 Mathematics

Siddharth, Lata, and Vivek invest ₹1570, ₹1760, and ₹1620 respectively to start a business. If the profit at the end of the year is ₹1540, then what is the share of Vivek in the profit?

A. ₹503
B. ₹501
C. ₹504 ✓
D. ₹506

Q8 Mathematics

In what duration (in years) will ₹7,200 fetch a simple interest of ₹1,080 at 6% per annum rate of interest?

A. 1.5
B. 2.5 ✓
C. 5
D. 3.5

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Q9 Mathematics

There are 25 members in group A, 26 members in group B and 21 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹137, ₹443 and ₹461, respectively. The overall average amount (in ₹) spent per member is:

A. 347
B. 344
C. 342 ✓
D. 339

Q10 Mathematics

The total surface area of a cube having side 91 cm is:

A. 49716 cm2
B. 49686 cm2 ✓
C. 49666 cm2
D. 49668 cm2

Q11 Mathematics

What will be the maximum value of the quadratic expression $10(x - 1) - 5x^2 + 4(2 - x) + 8$?

A. 6.9
B. 9.6
C. 8.7
D. 7.8 ✓

Q12 Mathematics

A and B start a business by investing capitals in the ratio 5:7. After 4 months, C joins the business with a capital equal to half of B's capital. After 8 months from the start, A withdraws 40% of his capital, while B continues with the same investment. At the end of one year, the total profit is ₹27,675. The share of profit of B (in ₹) is:

A. 17,175
B. 14,175 ✓
C. 16,175
D. 15,175

Q13 Mathematics

Two trains are moving in opposite directions at speeds of 130 km/hr and 70 km/hr. The length of one train is 130 m. The time taken by them to cross each other is 14 seconds. The length (in m) of the other train (rounded off to 2 decimal places) is:

A. 649.6
B. 647.78 ✓
C. 646.47
D. 650.67

Q14 Mathematics

The HCF and LCM of two numbers are 5 and 180 respectively. If one number is 45, what is the other number?

A. 25
B. 36
C. 20 ✓
D. 40

Q15 Mathematics

The average of the first 63 even natural numbers is:

A. 64 ✓
B. 63
C. 65
D. 62

Q16 Mathematics

Find the solution (x, y, z) for the following system of equations:

$x - y + z = 2$;
$2x - y - z = -6$;
$2x + 2y + z = -3$

A. (−2, −1, 3) ✓
B. (−2, −1, −3)
C. (−2, 1, 3)
D. (2, −1, 3)

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Q17 Mathematics

A pharmaceutical research laboratory purchases analytical testing kits priced at ₹12,000 each. The supplier offers a scheme of "Buy 10 kits, get 2 free," along with a volume discount of 15% on purchases exceeding ₹1,00,000, and an additional 5% institutional discount for research facilities. If the laboratory takes advantage of the complete scheme offer, what is the effective discount percentage they receive on the total value of kits? (Rounded off to two decimal places)

A. 30.25%

B. 32.71% ✓

C. 35.42%

D. 34.18%

Q18 Mathematics

Rohit gets double the amount in 6 years when invested at compound interest, compounded annually. In how many years will the amount become sixteen times itself?

A. 24 ✓

B. 12

C. 48

D. 96

Q19 Mathematics

The prices of articles of types P, Q, and R are ₹280, ₹180 and ₹120, respectively. Tejas buys these articles in the ratio 3 : 2 : 5 for a total of ₹12,600. How many articles of type Q did he purchase?

A. 7

B. 14 ✓

C. 13

D. 15

Q20 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-3) × 7

A. -36

B. -37

C. -34 ✓

D. -33

Q21 Mathematics

What is the mean of the following distribution?

Marks	16	21	47	80	99
No. of Students	24	38	26	32	13

A. 47 ✓

B. 67

C. 71

D. 74

Q22 Mathematics

[Question text / figure not saved in the source paper record. Options and official answer as released.]

A. 93.6° ✓

B. 84.5°

C. 102°

D. 110°

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Q23 Mathematics

If the mean of the following data is 47, find the value of X.

Class	30-40	40-50	50-60	60-70	70-80
Frequency	49	33	24	21	X

A. 3 ✓

B. 23

C. 8

D. 27

Q24 Mathematics

If $\sin A = \frac{3}{5}$, then find the value of $\sqrt{\frac{11+3\operatorname{cosec} A}{4-5\sin A}}$.

A. $\sqrt{2}$

B. 3

C. 4 ✓

D. $\sqrt{3}$

Q25 Mathematics

A right circular cone has the ratio of slant height to radius is 29:20. The volume of the cone is $\frac{24192}{5}\pi$ cm^3.

The curved surface area (in cm^2) of cone is

A. 829.5π

B. 835.2π ✓

C. 832.3π

D. 823.4π

Q26 Mathematics

By selling an article at $\frac{5}{12}$ of its actual selling price, Akash incurs a loss of 20%.

If he sells it at 80% of its actual selling price, then the profit percentage is

A. 52.3%

B. 55.3%

C. 53.6% ✓

D. 52.9%

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Q27 Mathematics

In a race of 1200 metres, Amit gives Bhushan a head-start of 200 metres. Amit starts 20 seconds after Bhushan. Amit overtakes Bhushan 4 minutes after he (Amit) starts running. Amit finishes the race 10 seconds before Bhushan. What is the running speed (in m/s) of Amit?

A. $3\frac{1}{3}$

B. $4\frac{4}{9}$ ✓

C. $4\frac{1}{3}$

D. $3\frac{4}{9}$

Q28 Mathematics

Simplify the following expression:

$\left(\frac{5}{6} \text{ of } 1.8\right) + \left(\frac{3}{4} \div 0.25\right)$.

A. 4

B. 4.5 ✓

C. 3.75

D. 4.25

Q29 Mathematics

Due to a decrease in manpower, production in a factory falls by 52%. By what percentage should the working hours be increased to restore the original level of production?

A. 48%

B. $104\frac{2}{3}\%$

C. $108\frac{1}{3}\%$ ✓

D. 52%

Q30 Mathematics

If $a = x + \frac{2}{x}$ and $b = x - \frac{2}{x}$, then find the value of $a^4 + b^4 - 2\,a^2\,b^2$.

A. 64 ✓

B. 49

C. 16

D. 36

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A shopkeeper fixes the marked price of an item 100% above its cost price. What percentage of discount on marked price should be allowed to gain 26%?

- A. 37% ✓
- B. 39%
- C. 40%
- D. 36%

Q2 Mathematics

Girish scored 424 marks in an examination and was 13 marks short of 19% of the maximum marks. In the same examination, his friend scored 529 marks. What is the percentage of marks scored by his friend?

- A. 22%
- B. 23% ✓
- C. 26%
- D. 25%

Q3 Mathematics

If a 7-digit number 54572A0 is completely divisible by 3, what is the minimum value of A?

- A. 1 ✓
- B. 5
- C. 4
- D. 3

Q4 Mathematics

Three bells ring at regular intervals. The first bell rings every 120 minutes, the second every 180 minutes, and the third every 240 minutes. If all three bells ring together at 9:00 a.m., at what time will they ring together again?

- A. 9 p.m. ✓
- B. 12 noon
- C. 3 p.m.
- D. 6 p.m.

Q5 Mathematics

Two quadratic equations $x^2 + x + p = 0$ and $x^2 + 2x - 3 = 0$ have one root common. What is a possible value of p?

- A. −2 ✓
- B. −1
- C. −3
- D. −4

Q6 Mathematics

Evaluate: (-9) - (-56) ÷ (-8) + (-4) × 7

- A. -46
- B. -47
- C. -43
- D. -44 ✓

Q7 Mathematics

Two numbers A and B are such that the sum of 10% of A and 20% of B is equal to three-fourths the sum of 20% of A and 10% of B. Find the ratio of A to B.

- A. 3 : 5
- B. 5 : 2 ✓
- C. 2 : 5
- D. 5 : 3

Q8 Mathematics

Find the difference between the compound interest, compounded annually, and the simple interest on ₹4,000 for 2 years at 6% per annum.

- A. ₹ 13.80
- B. ₹ 15.90
- C. ₹ 14.40 ✓
- D. ₹ 16.80

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Q9 Mathematics

Two trains move in opposite directions at 90 km/hr and 70 km/hr. One train is 480 m long. If they cross each other in 27 seconds, find the length of the other train (in metres).

- A. 720 ✓
- B. 725
- C. 730
- D. 735

Q10 Mathematics

In what duration (in years) will ₹7,200 fetch a simple interest of ₹360 at 4% per annum rate of interest?

- A. 2.25
- B. 1.25 ✓
- C. 2.5
- D. 0.25

Q11 Mathematics

The average weight of a group of 10 students is 50 kg. If the weight of the teacher is also included, the average weight increases by 1 kg. What is the teacher's weight?

- A. 59 kg
- B. 60 kg
- C. 58 kg
- D. 61 kg ✓

Q12 Mathematics

Two taps can fill a cistern in 2 hours and 57 hours respectively. A third tap can empty it in 57 hours. How long (in hours) will it take to fill half of the empty cistern, if all of them are opened together?

- A. 1 ✓
- B. 2
- C. 4
- D. 3

Q13 Mathematics

Two runners A and B start simultaneously from the same point on a circular track of length 840 m and run in the clockwise direction. The speed of A is 7 m/s and the speed of B is 5 m/s. At what distance from the starting point in the clockwise direction and after how many complete rounds by A, does A meet with B again the first time?

- A. 210 m after completing 3 rounds
- B. 420 m after completing 3 rounds ✓
- C. 210 m after completing 2 rounds
- D. 420 m after completing 2 rounds

Q14 Mathematics

Vanraj is twice as old as his younger brother, and his other brother is 3 years younger than the younger brother. If the sum of the ages of these three brothers 3 years ago was 20 years, find Vanraj's present age, in years.

- A. 15
- B. 18
- C. 16 ✓
- D. 14

Q15 Mathematics

A shopkeeper purchased 19 dozens of articles at the rate of ₹390 per dozen. He sold each one of them at the rate of ₹78. What percentage profit did he make?

- A. 137%
- B. 142%
- C. 140% ✓
- D. 143%

Q16 Mathematics

The perimeter of a certain sector of a circle of radius 8 cm is 24 cm. Find the area of the sector.

- A. 29 cm2
- B. 22 cm2
- C. 32 cm2 ✓
- D. 38 cm2

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Q17 Mathematics

The mean and the mode of a set of data are 17.9 and 24.7, respectively. Find the median of the data, using the empirical formula (correct to one decimal place).

A. 20.3
B. 21.4
C. 19.9
D. 20.2 ✓

Q18 Mathematics

Let C_1 and C_2 be two concentric circles with centre O. Let AB be a chord on C_1 the larger circle such that AB touches C_2 at the point P. Then which of the following is true?
(i) OP = AP
(ii) AP = PB
(iii) OP = 2PB
(iv) OP = AB

A. OP = AP
B. AP = PB ✓
C. OP = 2PB
D. OP = AB

Q19 Mathematics

Evaluate: 16 + 20 ÷ 4 - 2 × 3

A. 17
B. 18
C. 14
D. 15 ✓

Q20 Mathematics

A and B invest in a business in the ratio 3 : 2. If they earn a total profit of ₹25,000, then how much profit does B receive?

A. ₹5,000
B. ₹12,000
C. ₹10,000 ✓
D. ₹15,000

Q21 Mathematics

The ages of A and B are in the ratio 5 : 8. After 6 years, the ratio becomes 3 : 4. What is A's present age?

A. 11 years
B. 9.7 years
C. 7.5 years ✓
D. 9 years

Q22 Mathematics

There are 30 members in group A, 21 members in group B and 40 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹378, ₹355 and ₹224, respectively. The overall average amount (in ₹) spent per member is:

A. 305 ✓
B. 302
C. 304
D. 303

Q23 Mathematics

₹6241 is divided among A, B, C, and D in such a way that the shares of A and B, B and C, and C and D are in the ratios of 2 : 3, 4 : 5, and 10 : 3 respectively. The share of A (in ₹) is:

A. 1264 ✓
B. 1174
C. 1384
D. 1334

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Q24 Mathematics

By selling an article at $\frac{4}{11}$ of its actual selling price, Nirbhay incurs a loss of 20%.

If he sells it at 71% of its actual selling price, then the profit percentage is

A. 58.3%

B. 57.8%

C. 58.5%

D. 56.2% ✓

Q25 Mathematics

The surface area of a sphere is 154 cm^2. What is the radius of the sphere? (Use $\pi = \frac{22}{7}$)

A. 11 cm

B. 7 cm

C. 5 cm

D. 3.5 cm ✓

Q26 Mathematics

If $p + \frac{1}{m} = m + \frac{1}{n} = n + \frac{1}{p}$ $(p \neq m \neq n)$, then the value of $p \times m \times n$ is:

A. 0

B. ± 1 ✓

C. ± 2

D. $\pm \frac{1}{2}$

Q27 Mathematics

If $3(\sin^2\theta + \text{cosec}^2\theta) = 10$, then the value of $\cot^6\theta + \text{cosec}^6\theta$ is:

A. 43

B. 28

C. 35 ✓

D. 37

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Q28 Mathematics

P, Q and R, each working alone, can complete a piece of work in, respectively, 10 days, 15 days and 25 days. If P works on all days, Q works on every odd-numbered day and R works on every even-numbered day, then in how many days will the whole work be completed?

A. $8\frac{9}{25}$

B. $12\frac{3}{25}$

C. $10\frac{11}{25}$

D. $6\frac{12}{25}$ ✓

Q29 Mathematics

A sphere inscribes a cone of radius 3 cm and height $3\sqrt{2}$ cm. Find the surface area (in cm^2) of the sphere. [Use $\pi = \frac{22}{7}$]

A. $127\frac{2}{7}$ ✓

B. $86\frac{2}{3}$

C. $42\frac{1}{3}$

D. $14\frac{1}{7}$

Q30 Mathematics

Find the weighted mean of the first 5 natural numbers whose weights are equal to the corresponding numbers.

A. $\frac{11}{3}$ ✓

B. $\frac{13}{3}$

C. $\frac{11}{5}$

D. $\frac{12}{5}$

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 84 pages?

- A. 1680 ✓
- B. 1670
- C. 1690
- D. 1685

Q2 Mathematics

A quadratic polynomial f(x) gives a remainder of 5 when divided by (x - 2), and of -3 when divided by (x - 4). If f(x) is of the form $ax^2 + bx + c$ and the leading coefficient is 1, then which of the following is the correct quadratic equation f(x)=0?

- A. x2−10x+21=0 ✓
- B. x2−6x+11=0
- C. x2−8x+13=0
- D. x2−9x+20=0

Q3 Mathematics

In an election between two candidates, 80% of the registered voters cast their votes and 3% of the votes polled were found invalid. Winning candidate got 52% of the valid votes and won the election by a margin of 291 votes. How many voters were registered?

- A. 9378
- B. 9375 ✓
- C. 9370
- D. 9373

Q4 Mathematics

At what rate per annum will a sum of money become four times itself in 25 years under simple interest?

- A. 14%
- B. 12% ✓
- C. 10%
- D. 24%

Q5 Mathematics

The ratio of the angles of a triangle is 2:3:4. What percentage of the total angle measure is the largest angle? (Round to the nearest integer)

- A. 40%
- B. 46%
- C. 42%
- D. 44% ✓

Q6 Mathematics

Govind gets double the amount in 7 years when invested at compound interest,compounded annually. In how many years will the amount become eight times itself?

- A. 56
- B. 14
- C. 28
- D. 21 ✓

Q7 Mathematics

The sum of the cubes of the numbers 55, −30 and −25 is equal to:

- A. 132750
- B. 123570
- C. 123750 ✓
- D. 132570

Q8 Mathematics

What is the maximum value that must be assigned to A so that the 8-digit number 230A7807 is divisible by 3?

- A. 5
- B. 4
- C. 9 ✓
- D. 7

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Q9 Mathematics

There are 12 members in group A, 55 members in group B and 89 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹160, ₹109 and ₹181, respectively. The overall average amount (in ₹) spent per member is:

- **A.** 154 ✓
- **B.** 157
- **C.** 153
- **D.** 151

Q10 Mathematics

The marks obtained by a student in five subjects are: 72, 68, 74, 70, and 76. What is the average marks of the student per subject?

- **A.** 72 ✓
- **B.** 70
- **C.** 75
- **D.** 74

Q11 Mathematics

Three positive integers, a, b, c, satisfy: gcd (a, b) = 8, gcd (b, c) = 12, gcd (c, a) = 4 and LCM (a, b, c) = 240. Then, the minimum value of a + b + c is:

- **A.** 96
- **B.** 80
- **C.** 100 ✓
- **D.** 84

Q12 Mathematics

Which of the given ratios is the greatest?

3 : 17, 13 : 67, 10 : 37 and 5 : 9

- **A.** 3 : 17
- **B.** 5 : 9 ✓
- **C.** 13 : 67
- **D.** 10 : 37

Q13 Mathematics

A shopkeeper fixes the marked price of an item 136% above its cost price. What percentage of discount on marked price should be allowed to gain 18%?

- **A.** 50% ✓
- **B.** 48%
- **C.** 47%
- **D.** 51%

Q14 Mathematics

How many coins, each 5.5 cm in circumference and 2 mm thick, must be melted to form a cuboid of dimensions 14 cm × 11 cm × 8 cm? (Use π = 22/7)

- **A.** 2370
- **B.** 2560 ✓
- **C.** 2240
- **D.** 2480

Q15 Mathematics

Two taps can fill a cistern in 4 hours and 30 hours respectively. A third tap can empty it in 30 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

- **A.** 1 ✓
- **B.** 2
- **C.** 3
- **D.** 4

Q16 Mathematics

In a circular race of length 1530 m, Shahrukh and Amir start simultaneously from the same point and run in the same direction. Shahrukh completes one round in 85 seconds, while Amir completes one round in 90 seconds. How many different meeting points are there on the circumference of the track?

- **A.** 1 ✓
- **B.** 11
- **C.** 2
- **D.** 35

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Q17 Mathematics

Ansh walks to his school at a certain speed from his home in the morning and returns in the afternoon at a speed, which is 2 km/h slower than his speed in the morning. If the average speed of Ansh of going to and coming back from the school is 4.8 km/h, find the sum of the speeds (in km/h) of Ansh in the morning and afternoon.

A. 9

B. 10 ✓

C. 11

D. 8

Q18 Mathematics

Three friends X, Y and Z started a business by investing a sum of money in the ratio of 9 : 4 : 8. After 6 months, X withdraws half of his capital. If the sum invested by Z is ₹23,000, then out of a total annual profit of ₹33,000, what is the difference between X's and Y's profit?

A. ₹4660

B. ₹4840 ✓

C. ₹3880

D. ₹5845

Q19 Mathematics

The selling price of 48 pieces of an item is same as the cost price of its x pieces. If the profit is 25%, then find the value of x.

A. 40

B. 70

C. 50

D. 60 ✓

Q20 Mathematics

Evaluate: 16 + 20 ÷ 4 - 2 × 4

A. 15

B. 13 ✓

C. 16

D. 12

Q21 Mathematics

Solve the given equations for (x, y, z):

x + y + z = 2
6x − 4y + 5z = 31
5x + 2y + 2z = 13

A. (3, −2, −1)

B. (3, −2, 1) ✓

C. (3, 2, 1)

D. (−3, −2, 1)

Q22 Mathematics

A solid cylinder is cut into 5 identical pieces by making cuts parallel to its flat surfaces. The curved surface area of all pieces is equal to the flat surface area of all pieces. If the total surface area of a piece is S square units, then the total surface area of the cylinder was ___ square units initially.

A. 3S ✓

B. 5S

C. 2S

D. 4S

Q23 Mathematics

If $x = 7^{\frac{2}{3}} - 7^{\frac{-2}{3}}$, then the value of $x^3 + 3x$ is:

A. $\frac{2500}{42}$

B. $\frac{2400}{49}$ ✓

C. $\frac{790}{343}$

D. $\frac{800}{49}$

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Q24 Mathematics

If $(x+y) : (y+z) : (z+x) = 6 : 7 : 8$ and $x + y + z = 14$, then find the value of z.

- A. 6 ✓
- B. 8
- C. 5
- D. 7

Q25 Mathematics

By selling an article at $\frac{3}{11}$ of its marked price, Hitesh incurs a loss of 15%.

If he sells it at 54% of its marked price, then the profit percentage is

- A. 67.2%
- B. 69.5%
- C. 67.4%
- D. 68.3% ✓

Q26 Mathematics

The ratio of the lengths of two corresponding sides of two similar triangles is 16 : 14. The ratio of the areas of these two triangles, in the order mentioned, is:

- A. 257 : 197
- B. 256 : 196 ✓
- C. $16\sqrt{16} : 14$
- D. 16 : 14

Q27 Mathematics

The following table shows the heights of plants (in cm) and the corresponding number of plants. Find the mode of the data.

Height (in cm)	14	27	23	21	19	17
Number of Plants	1	3	6	12	7	5

- A. 23 cm
- B. 27 cm
- C. 21 cm ✓
- D. 24 cm

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Q28 Mathematics

What is the mode of the data given below? [Give your answer correct to 2 decimal places.]

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of patients	31	29	33	28	39	10	18

A. 62.75 ✓

B. 61.75

C. 65.75

D. 64.75

Q29 Mathematics

In a right-angled triangle ABC, ∠C=90°, ∠A=45°, and the length of the adjacent side to ∠A (side AC) is 7 units. Determine the length of the side AB (the hypotenuse).

A. 7 units

B. $14\sqrt{2}$ units

C. 14 units

D. $7\sqrt{2}$ units ✓

Q30 Mathematics

The sum of the interior angles of a regular polygon is 1620°. What is the difference (in degrees) between the measures of an interior angle and an exterior angle of the polygon?

A. $213\frac{2}{11}$

B. $151\frac{3}{11}$

C. $114\frac{6}{11}$ ✓

D. $182\frac{5}{11}$

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 95 pages?

A. 1905
B. 1910
C. 1890
D. 1900 ✓

Q2 Mathematics

The HCF of two numbers is 104 and their LCM is 1040. If one of the numbers is 208, what is the sum of the two numbers?

A. 732
B. 736
C. 724
D. 728 ✓

Q3 Mathematics

Evaluate: (-9) - (-56) ÷ (-8) + (-4) × 6

A. -39
B. -42
C. -43
D. -40 ✓

Q4 Mathematics

Rupesh's salary is ₹18000 per month. He spends ₹5000 on house rent, ₹2500 on bills and the rest of the amount is his monthly savings. Find his savings (in ₹) in a year, if in the month of his birthday, he spent his complete monthly saving for birthday celebration.

A. 115500 ✓
B. 105000
C. 126000
D. 94500

Q5 Mathematics

A man sold an article for ₹234 by first giving a d% discount on its marked price, and then another discount having the same nominal value (in ₹) as that of the first discount. If the marked price of the article is ₹1,800, then what is the value of d?

A. 43.5 ✓
B. 38.1
C. 41.9
D. 47

Q6 Mathematics

A man can row 8 km/hr in still water while speed of current is 3 km/hr. How much time (in hours) will he take to row 11 km downstream and 15 km upstream?

A. 5
B. 3
C. 4 ✓
D. 6

Q7 Mathematics

If 4 : 12 :: 2.1 : x and 9 : 36 :: 8 : y, what is the ratio of x to y?

A. 61 : 321
B. 63 : 320 ✓
C. 64 : 318
D. 67 : 330

Q8 Mathematics

Ashish has ₹1404 with him. He divides this amount between his two sons, Arun and Mahesh, and asks them to invest their respective shares at a compound interest rate of 8% per annum, compounded annually. It is observed that Arun's investment amounts to the same value after 17 years as Mahesh's investment does after 18 years. How much (in ₹) did Ashish give to Mahesh?

A. 729
B. 525
C. 675 ✓
D. 829

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Q9 Mathematics

At what rate (in percentage) per year will a sum of money 5 times itself in 20 years on simple interest?

A. 22
B. 40
C. 20 ✓
D. 18

Q10 Mathematics

Evaluate: (-9) - (-60) ÷ (-6) + (-2) × 9

A. -39
B. -37 ✓
C. -40
D. -36

Q11 Mathematics

A shopkeeper purchased 33 dozens of articles at the rate of ₹620 per dozen. He sold each one of them at the rate of ₹93. What percentage profit did he make?

A. 82%
B. 79%
C. 80% ✓
D. 83%

Q12 Mathematics

A car runs for 10 hours and Its speed during the i^{th} hour is i^3 km per hour, where i=1,2,3...,10. The average speed of the car for the journey is _____ km per hour.

A. 320.5
B. 305.2
C. 350.2
D. 302.5 ✓

Q13 Mathematics

100 men have provisions for 27 days. If 46 men have left, for how many days the same provisions would last for the remaining men?

A. 50 ✓
B. 54
C. 52
D. 48

Q14 Mathematics

The average marks of 17 students in a class is 40. If the marks of each student are doubled, find the new average.

A. 80 ✓
B. 17
C. 34
D. 40

Q15 Mathematics

Piyush bought an article for ₹331 and sold it to Payal at a loss of 5%. With this amount, Piyush bought another article and sold it at a gain of 60%. What is Piyush's overall gain percentage?

A. 48%
B. 50%
C. 52% ✓
D. 47%

Q16 Mathematics

₹6320 is divided among A, B, C, and D in such a way that the shares of A and B, B and C, and C and D are in the ratios of 2 : 3, 4 : 5, and 10 : 3 respectively. The share of A (in ₹) is:

A. 1400
B. 1280 ✓
C. 1350
D. 1190

Q17 Mathematics

There are 45 members in group A, 31 members in group B and 48 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹295, ₹311 and ₹233, respectively. The overall average amount (in ₹) spent per member is:

A. 272
B. 275 ✓
C. 276
D. 273

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Q18 Mathematics

If A's salary is 13% more than that of B, then by what per cent is B's salary less than that of A? (Give your answer correct to two decimal places.)

- **A.** 11.50% ✓
- **B.** 10.50%
- **C.** 14.22%
- **D.** 14.72%

Q19 Mathematics

If the ratio of the ages of A and B is 3 : 5, the ratio of the ages of B and C is 2 : 3, and the ratio of the ages of C and D is 3 : 4, what is the ratio of the ages of A and D?

- **A.** 7 : 10
- **B.** 3 : 13
- **C.** 3 : 10 ✓
- **D.** 5 : 11

Q20 Mathematics

If $2\text{cosec}A = 3\text{sec}A$, then find the value of $\frac{(1-\cos A)(1+\cos A)}{(1-\sin A)(1+\sin A)}$.

- **A.** $\frac{\sqrt{13}}{9}$
- **B.** $\frac{4}{9}$ ✓
- **C.** $\frac{2}{3}$
- **D.** $\frac{4}{\sqrt{13}}$

Q21 Mathematics

Solve the system of equations below for X, Y and Z:

$$X + 2Y + 4Z = 12$$
$$2X + 2Y + 3Z = 10$$
$$3X + 2Y + Z = 8$$

- **A.** X = −2, Y = −1, Z = 4
- **B.** X = −2, Y = 7, Z = 0 ✓
- **C.** X = 0, Y = 2, Z = 2
- **D.** X = −2, Y = 1, Z = 3

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Q22 Mathematics

If α, β are roots of the quadratic equation $2x^2 - 3x + 5 = 0$, find the value of $\alpha^2 + \beta^2$.

A. $-\frac{13}{4}$

B. $-\frac{11}{4}$ ✓

C. $\frac{7}{4}$

D. $\frac{17}{4}$

Q23 Mathematics

If $3x + 2y = 10$ and $2xy = 3$, then find the postive value of $3x - 2y$.

A. 10

B. 6

C. 12

D. 8 ✓

Q24 Mathematics

Priyanshi wants to solve the expression:

$3.6 + \frac{5}{4} \times 2.4 - \frac{1}{2}$

What is the value of the expression?

A. 6.5

B. 7.5

C. 7.1

D. 6.1 ✓

Q25 Mathematics

Find the area of the rectangle with length 10 cm and width $\sqrt{5}$ cm. (Round off the answer to 2 decimal places.)

A. 22.36 sq. cm. ✓

B. 15.98 sq. cm.

C. 18.52 sq. cm.

D. 17.58 sq. cm.

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Q26 Mathematics

Find the mode of the following distribution.

Class interval	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	30	48	72	36	24	18

A. 25

B. 22 ✓

C. 22.5

D. 24.25

Q27 Mathematics

ABCD is a rhombus such that ∠ACB = 50°. The value of ∠ADB is:

A. $60°$

B. $70°$

C. $50°$

D. $40°$ ✓

Q28 Mathematics

Calculate the median (rounded to two decimal places) from the following data:

Marks	0 -10	10 – 30	30 - 60	60 – 80	80 - 90
Number of students	9	19	34	12	6

Total frequency N = 80

A. 36.27

B. 33.14

C. 40.59 ✓

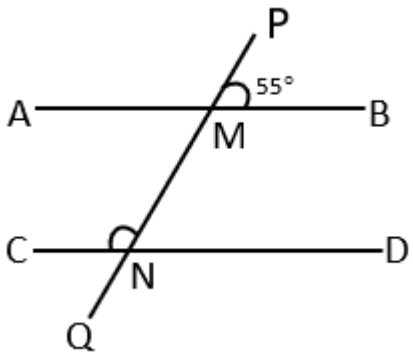
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Q29 Mathematics

Two parallel lines AB ∥ CD are cut by a transversal line PQ, as shown in the figure. If the angle ∠PMB=55° then find the angle ∠CNM.



A. 60°

B. 125° ✓

C. 75°

D. 55°

Q30 Mathematics

The breadth of a rectangular field is $\frac{2}{3}$ of its length. Its area is 600 m^2. Find the cost of fencing it all around at the cost of ₹200/m.

A. ₹32,000

B. ₹26,000

C. ₹30,000

D. ₹20,000 ✓

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

There are 42 members in group A, 31 members in group B and 32 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹335, ₹103 and ₹271, respectively. The overall average amount (in ₹) spent per member is:

A. 249
B. 242
C. 248
D. 247 ✓

Q2 Mathematics

If the standard deviation of 11, 13, 15, 17,...., 71 is m, then find the integral part of m.

A. 13
B. 18
C. 16
D. 17 ✓

Q3 Mathematics

A car covers one-fifth of the distance from A to B at the speed of 8 km/h, one-tenth of the distance at 25 km/h and the remaining at the speed of 20 km/h. Find the average speed of the whole journey.

A. 17.225 km/h
B. 15.625 km/h ✓
C. 14.225 km/h
D. 12.625 km/h

Q4 Mathematics

A and B complete a work in 22 days. If A alone can do it in 44 days, then B alone can do three-fourth of the same work in _____days.

A. 132
B. 99
C. 33 ✓
D. 66

Q5 Mathematics

The least common multiple of two numbers is 21 times the first number, and the highest common factor of the two numbers is a two-digit prime number. What is the least possible value of the second number?

A. 357
B. 231 ✓
C. 147
D. 273

Q6 Mathematics

A shopkeeper purchased 60 dozens of articles at the rate of ₹474 per dozen. He sold each one of them at the rate of ₹79. What percentage profit did he make?

A. 99%
B. 102%
C. 100% ✓
D. 101%

Q7 Mathematics

Find the mean proportional between 7.2 and 20.

A. 12 ✓
B. 8
C. 10
D. 11

Q8 Mathematics

Harishika bought an article for ₹200 and sold it to Ritu at a loss of 30%. With this amount, Harishika bought another article and sold it at a gain of 75%. What is Harishika's overall gain percentage?

A. 22.5% ✓
B. 24.5%
C. 19.4%
D. 17.5%

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Q9 Mathematics

A train of length 120 m travelling at 60 km/hr crosses another train travelling in the same direction at 24 km/hr in 30 seconds. What is the length (in m) of another train?

- A. 180 ✓
- B. 225
- C. 200
- D. 250

Q10 Mathematics

Kiran's salary is ₹18000 per month. He spends ₹5000 on house rent, ₹3000 on bills and the rest of the amount is his monthly savings. Find his savings (in ₹) in a year, if in the month of his birthday, he spent his complete monthly saving for birthday celebration.

- A. 110000 ✓
- B. 100000
- C. 90000
- D. 120000

Q11 Mathematics

In what duration (in years) will ₹8,400 fetch a simple interest of ₹840 at 5% per annum rate of interest?

- A. 2 ✓
- B. 3
- C. 1
- D. 4

Q12 Mathematics

Find the sum of all the interior angles of a regular polygon of 6 sides.

- A. 720° ✓
- B. 680°
- C. 760°
- D. 600°

Q13 Mathematics

A typist takes 40 minutes to type 10 pages. How many pages will he type in 88 minutes?

- A. 22 ✓
- B. 23
- C. 21
- D. 24

Q14 Mathematics

Arun has ₹1407 with him. He divides this amount between his two sons, Mahesh and Vijay, and asks them to invest their respective shares at a compound interest rate of 10% per annum, compounded annually. It is observed that Mahesh's investment amounts to the same value after 12 years as Vijay's investment does after 13 years. How much (in ₹) did Arun give to Vijay?

- A. 837
- B. 737
- C. 670 ✓
- D. 520

Q15 Mathematics

Water flows out through a circular pipe, whose internal diameter is 2 cm, at the rate of 4 metres per second into a cylindrical tank, the radius of whose base is 80 cm. By how much will the level of water rise in 24 minutes?

- A. 96 cm
- B. 100 cm
- C. 90 cm ✓
- D. 91 cm

Q16 Mathematics

A shopkeeper fixes the marked price of an item at 150% above its cost price. What percentage of discount on the marked price should be allowed to gain 20%?

- A. 49%
- B. 54%
- C. 55%
- D. 52% ✓

Q17 Mathematics

What number will be in the place of x?

2.8 : 3.8 : : x : 5.7

- A. 4.2 ✓
- B. 3.6
- C. 4.8
- D. 5.1

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Q18 Mathematics

The product of two consecutive natural numbers is 380. The greater of the two numbers is:

A. 12

B. 14

C. 24

D. 20 ✓

Q19 Mathematics

The average of 7 numbers is 47. If each number is decreased by 7, what will the new average be?

A. 40 ✓

B. 33

C. 7

D. 47

Q20 Mathematics

The population of a village was 2,90,000. It increased by 10% in the first year and increased by 30% in the second year. Its population after two years is _____.

A. 3,19,000

B. 4,06,000

C. 3,77,000

D. 4,14,700 ✓

Q21 Mathematics

Evaluate: 16 + 18 ÷ 6 - 3 × 4

A. 6

B. 7 ✓

C. 9

D. 10

Q22 Mathematics

What is the mean of the following distribution?

Marks	11	34	51	62	98
No. of Students	57	23	95	14	96

A. 79

B. 44

C. 58 ✓

D. 64

Q23 Mathematics

If 2 is subtracted from each of the numerator and the denominator of a fraction $\frac{a}{b}$, it becomes $\frac{1}{4}$. If 17 is added to the numerator and 8 is added to the denominator of the original fraction, then the fraction becomes $\frac{7}{7}$. What is the value of $(4a - b)$?

A. 4

B. 7

C. 6 ✓

D. 3

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Q24 Mathematics

A cylindrical rod has an outer curved surface area of 1300 cm^2. If the length of the rod is 60 cm, then the outer radius (in cm) of the rod, correct to two places of decimal, is:

$Take\ \pi = \frac{22}{7}$

A. 3.48

B. 1.88

C. 1.02

D. 3.45 ✓

Q25 Mathematics

Simplify

$25 - 5.6 \div 7 + 1.6 \times 0.5$

A. 25 ✓

B. 0

C. 23.4

D. 5.6

Q26 Mathematics

Find the value of $\frac{2\tan 30°}{1 + \tan^2 30°}$.

A. cos 90°

B. cos 60°

C. cos 45°

D. cos 30° ✓

Q27 Mathematics

If $a = \frac{3+\sqrt{5}}{3-\sqrt{5}}$ and $b = \frac{3-\sqrt{5}}{3+\sqrt{5}}$, find the value of $a^2 + b^2 + 3ab$.

A. 98

B. 42

C. 78

D. 50 ✓

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Q28 Mathematics

$\left(\frac{12}{9}\right)^{19} \times \left(\frac{9}{12}\right)^{5} \times \left(\frac{12}{9}\right)^{8} = \left(\frac{9}{12}\right)^{6m+11}$

A. $-\frac{35}{6}$

B. $-\frac{37}{6}$

C. $-\frac{34}{6}$

D. $-\frac{33}{6}$ ✓

Q29 Mathematics

Find the solution of the following system of linear equations:

2x + y + z = 25
x − 3y + 2z = 0
y − z = 6

A. $\frac{7}{4}\ \frac{55}{4}\ \frac{-17}{4}$

B. $\frac{55}{4}\ \frac{-17}{4}\ \frac{7}{4}$

C. $\frac{-17}{4}\ \frac{55}{4}\ \frac{7}{4}$

D. $\frac{55}{4}\ \frac{7}{4}\ \frac{-17}{4}$ ✓

Q30 Mathematics

The areas of similar triangles ΔABC and ΔPQR are 432 cm^2 and 588 cm^2, respectively. If the longest side PR of ΔPQR is 56 cm, then find the longest side AC of ΔABC.

A. 35 cm

B. 48 cm ✓

C. 52 cm

D. 24 cm

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A gardener waters three rows of plants using automatic sprays. Spray A activates after every 12 minutes, Spray B after every 15 minutes, and Spray C after every 20 minutes. If they first activate together at 9:45 AM, at what time will they activate together for the sixth time (including the one at the beginning)?

- A. 1:45 PM
- B. 2:45 PM ✓
- C. 2:55 PM
- D. 2:25 PM

Q2 Mathematics

Evaluate: 16 + 20 ÷ 5 - 2 × 4

- A. 12 ✓
- B. 14
- C. 11
- D. 15

Q3 Mathematics

The sum of 12 numbers is 540. Find their average.

- A. 45 ✓
- B. 46
- C. 43
- D. 44

Q4 Mathematics

For 4 waffles, a recipe needs 680 g of butter. Find the quantity of butter needed if you want to make 17 waffles.

- A. 2650 g
- B. 2890 g ✓
- C. 2930 g
- D. 3120 g

Q5 Mathematics

There are 52 members in group A, 22 members in group B and 36 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹420, ₹437 and ₹101, respectively. The overall average amount (in ₹) spent per member is:

- A. 323
- B. 319 ✓
- C. 322
- D. 320

Q6 Mathematics

The monthly incomes of two friends Tushar and Salil, are in the ratio 6 : 7 respectively and each of them saves ₹66,000 every month. If the ratio of their monthly expenditure is 2 : 4, find the monthly income of Tushar (in ₹).

- A. 79,200 ✓
- B. 78,200
- C. 1,10,880
- D. 80,200

Q7 Mathematics

A typist takes 40 minutes to type 2 pages. How long (in minutes) will he take to type 82 pages?

- A. 1630
- B. 1640 ✓
- C. 1650
- D. 1645

Q8 Mathematics

The length of each side of a rhombus is 17 cm and one of the diagonals is 30 cm. What is the area of the rhombus?

- A. 272 cm2
- B. 255 cm2
- C. 240 cm2 ✓
- D. 510 cm2

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Q9 Mathematics

A frequency distribution has a mean of 55 and a mode of 50. If the empirical relation holds, what should be the median of the data set? (Round off to two decimal places.)

A. 54.83
B. 53.86
C. 53.33 ✓
D. 54.21

Q10 Mathematics

A trader marks his goods at a certain price and offers a 10% discount on it. In addition, he runs a scheme where for every 104 articles purchased, 16 articles are given free. If he still makes a profit of 17% on the overall transaction, find out by what percentage the marked price of an article is more than its cost price. Assume the customer pays for only 104 articles.

A. 44%
B. 60%
C. 50% ✓
D. 53%

Q11 Mathematics

Two people, A and B, start running from the same point on a circular track of length 400 meters, but in opposite directions. A runs at 6 m/s and B at 4 m/s. In how many seconds will they meet for the first time?

A. 20 seconds
B. 50 seconds
C. 40 seconds ✓
D. 30 seconds

Q12 Mathematics

Veer has ₹1404 with him. He divides this amount between his two sons, Nitin and Pravin, and asks them to invest their respective shares at a compound interest rate of 8% per annum, compounded annually. It is observed that Nitin's investment amounts to the same value after 19 years as Pravin's investment does after 20 years. How much (in ₹) did Veer give to Pravin?

A. 829
B. 675 ✓
C. 729
D. 525

Q13 Mathematics

The price of fuel decreases by 30%, 20% and 50% in three successive months, but increases by 40% in the fourth month. What is the percentage increase or decrease in the price of fuel in the fourth month as compared to its original price?

A. Increase by 55.4%
B. Decrease by 57.2%
C. Increase by 63.2%
D. Decrease by 60.8% ✓

Q14 Mathematics

For what values of 'k' will the value of $(12x^2 - kx + 27)$ be always positive?

A. $k > 36$
B. $k < -36$
C. $-36 \leq k \leq 36$
D. $-36 < k < 36$ ✓

Q15 Mathematics

Two taps can fill a cistern in 4 hours and 32 hours respectively. A third tap can empty it in 4 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

A. 16
B. 32
C. 24
D. 8 ✓

Q16 Mathematics

Ramesh, Seema, and Shanaya invest ₹1230, ₹1710, and ₹1010 respectively to start a business. If the profit at the end of the year is ₹1580, then what is the share of Shanaya in the profit?

A. ₹405
B. ₹407
C. ₹403
D. ₹404 ✓

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Q17 Mathematics

A shopkeeper professes to sell his goods at a 35% loss but uses a false balance and gains 55%. The actual weight (rounded off to one decimal place) he uses instead of 1 kg is:

A. 417.9 gm

B. 419.4 gm ✓

C. 417.6 gm

D. 420.8 gm

Q18 Mathematics

Mansi and Neha started a partnership business, investing some amount in the ratio of 7 : 9. Utsavi joined then after six months with an amount equal to that of Neha. In what ratio should the profit at the end of one year be distributed among Mansi, Neha and Utsavi?

A. 13 : 14 : 8

B. 12 : 17 : 8

C. 18 : 19 : 10

D. 14 : 18 : 9 ✓

Q19 Mathematics

The cost price of 48 books is equal to the selling price of 36 books. Find the profit percentage. (Round off your answer to two decimal places.)

A. 39.84%

B. 36.23%

C. 33.33% ✓

D. 22.18%

Q20 Mathematics

Solve the following system of equations:

$$x+2y+4z=14$$
$$x+2y+z=7$$
$$2x+y+2z=2$$

A. $x=-\frac{11}{3}, y=3, z=\frac{7}{3}$

B. $x=-\frac{10}{3}, y=4, z=\frac{7}{3}$ ✓

C. $x=-\frac{10}{3}, y=4, z=\frac{8}{3}$

D. $x=-\frac{10}{3}, y=3, z=\frac{7}{3}$

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Q21 Mathematics

What is the fraction equal to $(0.\overline{5} + 0.1)$ in simplest form?

A. $\frac{71}{69}$

B. $\frac{51}{91}$

C. $\frac{59}{90}$ ✓

D. $\frac{78}{89}$

Q22 Mathematics

In a right-angled triangle, if the lengths of the opposite side and the adjacent side to angle θ are 7 cm and 21 cm, respectively, then what is the value of tanθ?

A. $\frac{2}{21}$

B. $\frac{1}{7}$

C. $\frac{1}{3}$ ✓

D. $\frac{1}{21}$

Q23 Mathematics

In a circle with center A, a 18 cm long chord is at a distance of 12 cm from the center. Find the length of the diameter.

A. 28 cm

B. 32 cm

C. 38 cm

D. 30 cm ✓

Q24 Mathematics

What is the value of (9x + 7y), if mean of the following distribution is 50?

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	8	18	x	2	y	52

A. 184 ✓

B. 191

C. 166

D. 193

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Q25 Mathematics

Simplify: $\frac{(2.33)^3+(1.55)^3+(1.22)^3-3\times2.33\times1.55\times1.22}{(2.33)^2+(1.55)^2+(1.22)^2-3.6115-2.8426-1.891}$

A. 5.2

B. 5.1 ✓

C. 5.3

D. 5

Q26 Mathematics

If $5^{3x+4} = (5^4)^{105}$, then find the integral part of x.

A. 183

B. 128

C. 138 ✓

D. 182

Q27 Mathematics

A boat goes 20,000 m upstream and 44,000 m downstream in 8 hours while it goes 15,000 m upstream and 22,000 m downstream in 5 hours. The speed of boat in still water is:

A. $2\frac{1}{9}$ m/s

B. $2\frac{2}{9}$ m/s ✓

C. $3\frac{2}{9}$ m/s

D. $3\frac{4}{9}$ m/s

Q28 Mathematics

There is a wooden cube with an edge length of 14 cm. A hemisphere with a radius of 7 cm is carved out from each face of the cube. Find the surface area (in cm^2) of the remaining structure. (Use $\pi = \frac{22}{7}$)

A. 2150

B. 1950

C. 1800

D. 2100 ✓

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Q29 Mathematics

At what rate per annum will a sum of money become five times itself in 11 years under simple interest?

A. $38\frac{8}{11}\%$

B. $36\frac{4}{11}\%$ ✓

C. $72\frac{8}{11}\%$

D. $34\frac{4}{11}\%$

Q30 Mathematics

A cylindrical wax block with radius 7 cm and height 10 cm is melted and reshaped into a cone with the same base radius. Find the height of the cone.

$\left(\text{Use } \pi = \frac{22}{7}\right)$

A. 20 cm

B. 18 cm

C. 25 cm

D. 30 cm ✓

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A shopkeeper fixes the marked price of an item 160% above its cost price. What percentage of discount on marked price should be allowed to gain 30%?

A. 49%
B. 48%
C. 47%
D. 50% ✓

Q2 Mathematics

Sharad is two times as old as his younger brother, and his other brother is 3 years younger than the younger brother. If the sum of the ages of these three brothers 3 years ago was 28 years, find Sharad's present age, in years.

A. 20 ✓
B. 18
C. 22
D. 26

Q3 Mathematics

Two trains are running with the speed of 49 km/hr and 59 km/hr towards each other on parallel tracks. Their lengths are 349 m and 371 m, respectively. In how much time (in seconds) will they completely pass each other?

A. 30
B. 42
C. 24 ✓
D. 34

Q4 Mathematics

100 men have provisions for 27 days. If 50 men have left, for how many days the same provisions would last for the remaining men?

A. 54 ✓
B. 56
C. 52
D. 58

Q5 Mathematics

A shopkeeper professes to sell his goods at a 45% loss but uses a false balance and gains 50%. The actual weight (rounded off to one decimal place) that he uses instead of 1 kg is:

A. 369.3 gm
B. 368.6 gm
C. 366.7 gm ✓
D. 365.2 gm

Q6 Mathematics

If the mean proportional between x and 36 is 18, what is the value of x?

A. 6
B. 9 ✓
C. 12
D. 18

Q7 Mathematics

Two numbers have an HCF of 12 and an LCM of 840. If one of the numbers is 84, then find the other number.

A. 368
B. 120 ✓
C. 840
D. 168

Q8 Mathematics

A boat covers a certain distance downstream in 6 hours and takes 8 hours to return upstream to the starting point. If the speed of the stream is 4 km/h, find the speed of the boat in still water.

A. 28 km/hr ✓
B. 12 km/hr
C. 18 km/hr
D. 24 km/hr

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Q9 Mathematics

Find the average value of the first 350 positive multiples of 7.

A. 1254.5
B. 1326.5
C. 1416.5
D. 1228.5 ✓

Q10 Mathematics

Gopal has ₹1394 with him. He divides this amount between his two sons, Akshay and Arjun, and asks them to invest their respective shares at a compound interest rate of 5% per annum, compounded annually. It is observed that Akshay's investment amounts to the same value after 16 years as Arjun's investment does after 17 years. How much (in ₹) did Gopal give to Arjun?

A. 814
B. 680 ✓
C. 530
D. 714

Q11 Mathematics

Trisha and Riya started a partnership business, investing some amount in the ratio of 8 : 5. Poorva joined then after six months with an amount equal to that of Riya. In what ratio should the profit at the end of one year be distributed among Trisha, Riya and Poorva?

A. 15 : 5 : 2
B. 19 : 15 : 8
C. 17 : 7 : 3
D. 16 : 10 : 5 ✓

Q12 Mathematics

The monthly incomes of two friends Vipul and Vijay, are in the ratio 6 : 7 respectively and each of them saves ₹66,000 every month. If the ratio of their monthly expenditure is 1 : 3, find the monthly income of Vipul (in ₹).

A. 1,00,800
B. 72,000 ✓
C. 71,000
D. 73,000

Q13 Mathematics

There are 69 members in group A, 65 members in group B and 88 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹468, ₹120 and ₹276, respectively. The overall average amount (in ₹) spent per member is:

A. 286
B. 288
C. 294
D. 290 ✓

Q14 Mathematics

If 9 students can prepare 117 charts in 3 hours, how many students are needed to prepare 208 charts in 1 hour?

A. 42 students
B. 45 students
C. 48 students ✓
D. 46 students

Q15 Mathematics

If A's salary is 113% more than that of B, then by how much percent is B's salary less than that of A (correct to 2 decimal places)?

A. 51.35%
B. 50.45%
C. 55.15%
D. 53.05% ✓

Q16 Mathematics

At what rate per annum will a sum of money become five times itself in 4 years under simple interest?

A. 98%
B. 200%
C. 100% ✓
D. 102%

Q17 Mathematics

A shopkeeper purchased 48 dozens of articles at the rate of ₹300 per dozen. He sold each one of them at the rate of ₹90. What percentage profit did he make?

A. 257%
B. 262%
C. 259%
D. 260% ✓

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Q18 Mathematics

If 3A = 4B = 8C, what is A : B : C?

A. 6 : 3 : 8

B. 8 : 6 : 3 ✓

C. 6 : 8 : 3

D. 8 : 4 : 3

Q19 Mathematics

A ladder 28 meters long leans against a wall, making an angle of 60° with the ground. Find the height at which the ladder touches the wall. (Use √3 = 1.74)

A. 21.5 m

B. 22.65 m

C. 23.8 m

D. 24.36 m ✓

Q20 Mathematics

For equation $(2m-3)x^2 + (m+1)x + 5 = 0$ to represent a quadratic equation, which of the following must be definitely true?

A. $m = -1$

B. $m \neq \frac{3}{2}$ ✓

C. $m \neq 2$

D. $m = \frac{-3}{2}$

Q21 Mathematics

Simplify $\frac{(555+444)^2+(555-444)^2}{555\times555+444\times444}$.

A. 2 ✓

B. 1000

C. 999

D. 111

Q22 Mathematics

Find the value of y, satisfying $22 \times 3 \times 816 \div \sqrt{2601} = y + 794$

A. 258

B. 256

C. 270

D. 262 ✓

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Q23 Mathematics

$\left(\text{Take } \pi = \frac{22}{7}\right)$

A. $\sqrt{\frac{692}{33}}$

B. $\sqrt{\frac{703}{33}}$

C. $\sqrt{\frac{700}{33}}$ ✓

D. $\sqrt{\frac{710}{33}}$

Q24 Mathematics

The sum of all interior angles in a trapezium is _____.

A. 180°

B. 360° ✓

C. 540°

D. 240°

Q25 Mathematics

Two tangents, AB and AC, are drawn on a circle from an external point A, which is 6 cm away from its centre O. If the radius of the circle is 3 cm, then what is the measure of angle OBC?

A. 30° ✓

B. 100°

C. 120°

D. 60°

Q26 Mathematics

If the mean of the following data is 35, find the value of X.

Class	10-20	20-30	30-40	40-50	50-60
Frequency	15	21	43	41	X

A. 8

B. 11

C. 14

D. 5 ✓

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Q27 Mathematics

A manufacturer is making conical paper cups of height 24 cm and radius 7 cm. How much paper (in m^2 correct up to 2 decimal places) is needed to make 1000 such cups?

(Take $\pi = 3.14$)

- **A.** 54.95 m2 ✓
- **B.** 71.34 m2
- **C.** 80.34 m2
- **D.** 70.34 m2

Q28 Mathematics

The following frequency table gives the marks obtained by 48 students in a class test.

Marks	Frequency
7	12
8	13
9	12
10	11

With reference to the frequency table, match the following statements: (Values are rounded off to three decimal places.)

Column P		Column Q	
i.	The mean of the distribution	1.	8.485
ii.	The standard deviation of the distribution	2.	1.207
iii.	The variance of the distribution	3.	1.099

- **A.** i - 1, ii - 3 and iii - 2 ✓
- **B.** i - 2, ii - 3 and iii - 1
- **C.** i - 1, ii - 2 and iii - 3
- **D.** i - 3, ii - 1 and iii - 2

Q29 Mathematics

If $a + \frac{1}{a} = 3$, then find the value of $a^6 + \frac{1}{a^6}$.

- **A.** 321
- **B.** 322 ✓
- **C.** 324
- **D.** 323

Q30 Mathematics

$\left(\frac{28}{9}\right)^{11} \times \left(\frac{9}{28}\right)^{16} \times \left(\frac{28}{9}\right)^{17} = \left(\frac{9}{28}\right)^{2m+8}$

- **A.** -26
- **B.** 1
- **C.** -10 ✓
- **D.** -9

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

100 men have provisions for 27 days. If 25 men have left, for how many days the same provisions would last for the remaining men?

A. 34
B. 40
C. 38
D. 36 ✓

Q2 Mathematics

Ajay has ₹1404 with him. He divides this amount between his two sons, Prakash and Gopal, and asks them to invest their respective shares at a compound interest rate of 8% per annum, compounded annually. It is observed that Prakash's investment amounts to the same value after 18 years as Gopal's investment does after 19 years. How much (in ₹) did Ajay give to Gopal?

A. 675 ✓
B. 729
C. 829
D. 525

Q3 Mathematics

A, B, and C run a 1200 m race. A gives to B a headstart of 300 m, and to C a headstart of 600 m. A finishes the race 30 seconds before B and 60 seconds before C. If A's speed is 10 m/s, then find the respective speeds of B and C. [Give your answer in m/s, and round off, wherever necessary, to one place after decimal.]

A. 7.5 m/s, 2.5 m/s
B. 6 m/s, 3.3 m/s ✓
C. 8.5 m/s, 5 m/s
D. 5.5 m/s, 3 m/s

Q4 Mathematics

If A's salary is 126% more than that of B, then by how much percent is B's salary less than that of A (correct to 2 decimal places)?

A. 55.75% ✓
B. 54.65%
C. 54.74%
D. 56.18%

Q5 Mathematics

Two trains running in opposite directions at 40 km/hr and 52 km/hr cross each other in 18 seconds . If one train is 250 m long, then find the length of the other train.

A. 220 m
B. 210 m ✓
C. 200 m
D. 190 m

Q6 Mathematics

There are 85 members in group A, 23 members in group B and 42 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹407, ₹365 and ₹280, respectively. The overall average amount (in ₹) spent per member is:

A. 368
B. 365 ✓
C. 362
D. 363

Q7 Mathematics

Let ABC and DEF be two congruent triangles such that ∠A = ∠D. If AC = DF = 6 cm, and DE = 5 cm, then find the length (in cm) of AB.

A. 8
B. 5 ✓
C. 10
D. 6

Q8 Mathematics

Three positive integers, A, B, and C, satisfy the following conditions: HCF(A,B) = 12, HCF(B,C) = 18, HCF(A,C) = 6 and LCM(A,B,C) = 1080. If A = 12x, B = 36y, and C = 18z, where x, y, and z are pairwise coprime positive integers, then the minimum possible value of A + B + C is:

A. 224
B. 220
C. 222 ✓
D. 216

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Q9 Mathematics

The radius of a right circular cone is increased by 8% and slant height is decreased by 15%. Find the percentage change in curved surface area of the cone.

A. increases by 7%

B. decreases by 8.2% ✓

C. decreases by 7%

D. decreases by 11.5%

Q10 Mathematics

A trader marks an article at a certain price and offers a 20% discount on it. Additionally, for every 120 articles purchased, he gives 3 more articles free of cost. If his overall profit on the transaction is 28%, find the percentage by which the marked price of an article exceeds its cost price. Assume the customer pays for only 120 articles.

A. 60%

B. 72%

C. 64% ✓

D. 68%

Q11 Mathematics

If the sum of all the external angles of a regular polygon is two-thirds of all its interior angles, then the number of sides of the polygon is equal to:

A. 6

B. 7

C. 4

D. 5 ✓

Q12 Mathematics

The present ages of Ayushi and Anmol are in the ratio of 2 : 3 respectively. After 6 years the ratio of their ages will be 8 : 9. What is the positive difference (in years) in their present ages?

A. 1 ✓

B. 19

C. 11

D. 12

Q13 Mathematics

In an isosceles triangle ABC, the equal sides AB and AC are each 10 cm, and the base BC is 12 cm. Find the area of the triangle.

A. 45 cm2

B. 36 cm2

C. 48 cm2 ✓

D. 40 cm2

Q14 Mathematics

If A : B = 2 : 3, B : C = 4 : 3 and C : D = 6 : 7, then A : B : C : D is:

A. 16 : 24 : 16 : 21

B. 16 : 22 : 18 : 21

C. 14 : 24 : 18 : 21

D. 16 : 24 : 18 : 21 ✓

Q15 Mathematics

The mean proportional of 18 and 128 is:

A. 50

B. 51

C. 48 ✓

D. 49

Q16 Mathematics

The average of first 13 multiples of 8 is:

A. 13

B. 52

C. 56 ✓

D. 8

Q17 Mathematics

The population of a village was 2,90,000. It increased by 15% in the first year and increased by 30% in the second year. Its population after two years is _____.

A. 3,77,000

B. 4,20,500

C. 3,33,500

D. 4,33,550 ✓

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Q18 Mathematics

The ages (in years) of patients in a clinic are recorded as follows: 15 , 18 , 21 , 21 , 23 , 25 , 28 , 30 , 35 , 40 , 45 , 50 , 55. Calculate the difference between the median age now and after removing the oldest patient (55 years) from the data set.

A. 2.5 years

B. 1.5 years ✓

C. 1.25 years

D. 1.75 years

Q19 Mathematics

A shopkeeper sold two items for ₹10,000 each. He suffered a loss of 20% on one item and earned 20% profit on the other item. What is his profit or loss percentage in the whole transaction?

A. 3% loss

B. 4% loss ✓

C. 4% gain

D. 3% gain

Q20 Mathematics

A person runs a concession stand at a basketball game and sells burgers and soft drinks. Each burger costs ₹15 and each soft drink costs ₹5. At the end, a total of ₹785 is earned by selling a total of 87 burgers and soft drinks combined. How many soft drinks are sold?

A. 27

B. 60

C. 35

D. 52 ✓

Q21 Mathematics

Simplify: $\frac{\sqrt[3]{5832}}{\sqrt[4]{256}} \times \frac{2}{54} \times 54$

A. 9 ✓

B. 11

C. 19

D. 13

Q22 Mathematics

By selling an article at $\frac{4}{13}$ of its marked price, Hitesh incurs a loss of 30%.

If he sells it at 60% of its marked price, then the profit percentage is

A. 36.3%

B. 36.5% ✓

C. 37.8%

D. 39.8%

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Q23 Mathematics

If a and b, $b > a$, are the roots of the equation $6x^2 + 1x - 2 = 0$, then what is the value of $(2a + 3b)$?

A. $\frac{4}{13}$

B. $\frac{1}{8}$

C. $\frac{3}{2}$

D. $\frac{1}{6}$ ✓

Q24 Mathematics

Simplify $\left(3.6 \div \frac{3}{5}\right) + \left(\frac{7}{3} \times \frac{2.4}{1.4}\right) - \left(\frac{5}{6} + \frac{14}{12}\right)$.

A. 8 ✓

B. 7

C. 9

D. 6

Q25 Mathematics

P and Q can complete a piece of work in 14 days and 19 days, respectively. They work on alternate days, beginning with P. The whole work will be completed in:

A. $16\frac{2}{19}$ days ✓

B. $14\frac{1}{19}$ days

C. $12\frac{4}{19}$ days

D. $18\frac{3}{19}$ days

Q26 Mathematics

If $x^4 = 322 - \frac{1}{x^4}$ and $x \geq 1$, then the value of $x^3 - \frac{1}{x^3}$ is:

A. 76 ✓

B. 64

C. 72

D. 62

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Q27 Mathematics

A 24 m long ladder is leaning against a wall. If the ladder makes an angle of 30^{o} with the wall, what is the distance (in m) of the foot of the ladder from the wall?

A. $12\sqrt{2}$

B. $\frac{12}{\sqrt{3}}$

C. 12 ✓

D. $12\sqrt{3}$

Q28 Mathematics

If the mean of the following data is 35, find the value of X.

Class	10-20	20-30	30-40	40-50	50-60
Frequency	49	33	24	21	X

A. 52

B. 55 ✓

C. 42

D. 48

Q29 Mathematics

At what rate per annum will a sum of money become five times itself in 6 years under simple interest?

A. $66\frac{2}{3}\%$ ✓

B. $64\frac{2}{3}\%$

C. $68\frac{1}{3}\%$

D. $133\frac{1}{3}\%$

Q30 Mathematics

Find the value of y, *satisfying* $26 \times 5 \times 715 \div \sqrt{3025} = y + 913$

A. 777 ✓

B. 772

C. 771

D. 780

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

If A's salary is 143% more than that of B, then how much percent is B's salary less than that of A (correct to 2 decimal places)?

- A. 58.85% ✓
- B. 61.92%
- C. 59.64%
- D. 56.62%

Q2 Mathematics

Eight years ago from now, the average age of A and B was 24 years. The average age of A, B and C today is 32 years. How old will C be after 16 years from now?

- A. 40 years
- B. 80 years
- C. 48 years ✓
- D. 56 years

Q3 Mathematics

If 3 : 27 :: 5.6 : x and 5 : 35 :: 6 : y, then what is the ratio of x to y?

- A. 4 : 6
- B. 11 : 15
- C. 7 : 3
- D. 6 : 5 ✓

Q4 Mathematics

There are 25 members in group A, 32 members in group B and 31 members in group C. All the members of these groups went to a restaurant. The average amounts spent on each member of groups A, B and C are ₹101, ₹249 and ₹269, respectively. The overall average amount (in ₹) spent per member is:

- A. 216
- B. 219
- C. 215
- D. 214 ✓

Q5 Mathematics

A boat travels 36 km downstream and 24 km upstream, taking a total of 6 hours. If the speed of the stream is 2 km/h, the time taken (in hours) for each journey, respectively, is:

- A. (3.0 and 3.0) ✓
- B. (3.2 and 2.8)
- C. (3.6 and 2.4)
- D. (3.4 and 2.6)

Q6 Mathematics

The average of first 13 multiples of 9 is:

- A. 9
- B. 63 ✓
- C. 13
- D. 58.5

Q7 Mathematics

The sum of all the interior angles of a regular polygon is 2520°. Find the measure of each of its exterior angles.

- A. 22°
- B. 26°
- C. 25.75°
- D. 22.5° ✓

Q8 Mathematics

Amit invested an equal sum of money in both simple interest and compound interest, compounded annually schemes. The time period for both investments was 2 years, and the rate of interest was 4% per annum. At the end of 2 years, he noticed that the interest earned from compound interest exceeded that from simple interest by ₹58. What was the principal amount invested under compound interest?

- A. 35500
- B. 36600
- C. 35350
- D. 36250 ✓

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Q9 Mathematics

A dealer buys two articles X and Y for ₹2300 each. He marks each of them at the same price. He sells X by giving two successive discounts of 46% and 68% and still earns ₹460 as profit. If he sells Y at a single discount of 73%, then what is the profit percentage on Y?

A. 86.5%
B. 86%
C. 87.5% ✓
D. 87%

Q10 Mathematics

If a 7-digit number 65770A4 is completely divisible by 4, what is the minimum value of A?

A. 3
B. 4
C. 0 ✓
D. 2

Q11 Mathematics

A boat takes 8 hours to row 72 km downstream and 12 hours to row the same distance upstream. Find the boat's rate in still water and the rate of current, respectively.

A. 6.5 km/hr and 0.5 km/hr
B. 9.5 km/hr and 3.5 km/hr
C. 8.5 km/hr and 2.5 km/hr
D. 7.5 km/hr and 1.5 km/hr ✓

Q12 Mathematics

P sells an item to Q at 53% profit. Q sells the same item to R at 68% loss. If R paid ₹ 3060 for the item, then at what price (in ₹) is the item purchased by P?

A. 6253
B. 6247
C. 6250 ✓
D. 6252

Q13 Mathematics

Evaluate: 16 + 20 ÷ 4 - 3 × 3

A. 14
B. 11
C. 15
D. 12 ✓

Q14 Mathematics

The least common multiple of 64, 128 and A is 4480. The difference between the maximum and minimum possible values of A is:

A. 5444
B. 4445 ✓
C. 4454
D. 4544

Q15 Mathematics

If (5, 5) are the coordinates of the geometric centre of a triangle whose vertices are (9, 5), (4 ,p) and (q ,4), then find the values for p and q, respectively.

A. 2 , 6
B. 6 , 2 ✓
C. 4 , 3
D. 3 , 4

Q16 Mathematics

The monthly incomes of two friends Ajay and Amit, are in the ratio 6 : 7 respectively and each of them saves ₹63,000 every month. If the ratio of their monthly expenditure is 2 : 4, find the monthly income of Ajay (in ₹).

A. 75,600 ✓
B. 76,600
C. 74,600
D. 1,05,840

Q17 Mathematics

Two taps can fill a cistern in 4 hours and 26 hours respectively. A third tap can empty it in 26 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

A. 1 ✓
B. 2
C. 4
D. 3

Q18 Mathematics

Meenakshi and Meena invest in a business in the ratio 12 : 32. If total profit is ₹2,904, then what is difference between the profit (in ₹) of Meenakshi and Meena?

A. ₹1,320 ✓
B. ₹1,270
C. ₹1,470
D. ₹1,220

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Q19 Mathematics

A right circular cone has a radius of 7 cm. Its slant height is 25 cm. What is the total surface area of the cone? (Use π = 22/7)

A. $792\ \text{cm}^2$

B. $686\ \text{cm}^2$

C. $704\ \text{cm}^2$ ✓

D. $814\ \text{cm}^2$

Q20 Mathematics

Three solid cubes whose edges measure 1 cm, 6 cm, and 8 cm, respectively, are melted and recast into a single cube. What is the length (in cm) of the diagonal of the cube?

A. $8\sqrt{2}$

B. $8\sqrt{3}$

C. $9\sqrt{3}$ ✓

D. $9\sqrt{2}$

Q21 Mathematics

A researcher calculates the final performance score of students based on two components:

- Assignments (weight 40%)
- Exams (weight 60%)

A student scores:

- 75 in assignments
- 85 in exams

What is the student's weighted arithmetic mean score?

A. 82

B. 81 ✓

C. 80

D. 83

Q22 Mathematics

If $\text{cosec}A = \frac{5}{4}$, then find the value of $4\cot A \sec A + 3$.

A. 8 ✓

B. 3

C. 5

D. 6

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Q23 Mathematics

What is the mode of the data given below? [Give your answer correct to 2 decimal places.]

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of patients	24	29	26	35	20	23	10

A. 53.75 ✓

B. 55.75

C. 57.75

D. 51.75

Q24 Mathematics

A, B, and C can complete a task in 12 days, 15 days, and 18 days, respectively. B works every day and A and C work on alternate days, beginning with C on the first day. How many days will it take to do the task?

A. $7\frac{17}{27}$

B. $7\frac{11}{27}$ ✓

C. $7\frac{7}{27}$

D. $7\frac{5}{27}$

Q25 Mathematics

If the quadratic equation $x^2 - (2+h)x + h^2 - 4h + 4 = 0$ has identical roots, then what are the possible values of h?

A. $h = -1, h = -\frac{1}{2}$

B. $h = -\frac{2}{3}, h = 6$

C. $h = 0, h = -1$

D. $h = \frac{2}{3}, h = 6$ ✓

Q26 Mathematics

The selling price of 25 books is equal to the cost price of 19 books. Find the loss or gain percentage.

A. $\frac{100}{6}\%\ loss$

B. 24% gain

C. 24% loss ✓

D. $\frac{100}{6}\%\ gain$

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Q27 Mathematics

At what rate per annum will a sum of money become five times itself in 9 years under simple interest?

A. $46\frac{8}{9}\%$

B. $44\frac{4}{9}\%$ ✓

C. $42\frac{4}{9}\%$

D. $88\frac{8}{9}\%$

Q28 Mathematics

The ratio of the sum of odd positive integers from 1 to 100 to the sum of even positive integers from 150 to 200 is:

A. 50:91 ✓

B. 50:101

C. 50:71

D. 50:81

Q29 Mathematics

$$If\ 16\%\ of\ 50\ -\frac{4}{5}\times\sqrt[3]{729}\times\sqrt{25}=y, then\ the\ value\ of\ y\ is$$

A. -28 ✓

B. -29

C. -23

D. -19

Q30 Mathematics

If $4a^2+9b^2=49$ and $ab=6$, then find the postive value of $2a+3b$.

A. 15

B. 11 ✓

C. 13

D. 9

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Mathematics

30 Questions • Answer Key

Q1 Mathematics

A teacher needs to split 300 students into three groups so that the second and third groups have a ratio of 3 : 7, and the first and third groups have a ratio of 2 : 7. Which of the following is the correct number of students in the second group?

- A. 75 ✓
- B. 88
- C. 64
- D. 72

Q2 Mathematics

Evaluate: (-9) - (-56) ÷ (-14) + (-4) × 9

- A. -51
- B. -49 ✓
- C. -52
- D. -48

Q3 Mathematics

The ratio of boys to girls in two sections A and B of a class is the same. Section A comprises of 36 boys and 24 girls. If there are 28 girls in section B, how many boys are there in that section?

- A. 45
- B. 48
- C. 42 ✓
- D. 40

Q4 Mathematics

In a circular race of 1850 m, Aman and Suman start from the same point and at the same time with speeds of 22 km/h and 15 km/h, respectively. After how long will they meet again for the first time on the track when they are running in the opposite direction?

- A. 170 seconds
- B. 189 seconds
- C. 172 seconds
- D. 180 seconds ✓

Q5 Mathematics

Two taps can fill a cistern in 4 hours and 29 hours respectively. A third tap can empty it in 29 hours. How long (in hours) will it take to fill one-fourth of the empty cistern, if all of them are opened together?

- A. 3
- B. 2
- C. 1 ✓
- D. 4

Q6 Mathematics

The marks obtained by 12 students out of 50 are 24, 25, 32, 23, 40, 27, 30, 25, 20, 15, 16, 45. Find the median marks.

- A. 27
- B. 24
- C. 25 ✓
- D. 23

Q7 Mathematics

A dealer buys two articles X and Y for ₹3,500 each. He marks each of them at the same price. He sells X by giving two successive discounts of 45% and 60% and still earns ₹889 as profit. If he sells Y at a single discount of 69%, then what is the profit percentage on Y?

- A. 75%
- B. 76%
- C. 76.7% ✓
- D. 75.7%

Q8 Mathematics

A shopkeeper professes to sell his goods at a 35% loss but uses a false balance and gains 75%. The actual weight (rounded off to one decimal place) he uses for 1 kg is:

- A. 372.9 gm
- B. 371.4 gm ✓
- C. 374.5 gm
- D. 376.5 gm

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Q9 Mathematics

Three positive integers, P, Q, and R, are such that the highest common factor of P and Q is 15, the highest common factor of Q and R is 10, and the highest common factor of R and P is 5. If the sum P + Q + R is as small as possible, the value of P × Q × R is:

A. 6000

B. 4500 ✓

C. 3000

D. 1500

Q10 Mathematics

Salil's salary is ₹18000 per month. He spends ₹5500 on house rent, ₹1500 on bills and the rest of the amount is his monthly savings. Find his savings (in ₹) in a year, if in the month of his birthday, he spent his complete monthly saving for birthday celebration.

A. 99000

B. 110000

C. 121000 ✓

D. 132000

Q11 Mathematics

A building contractor employs 25 skilled workers and 5 unskilled workers. To a skilled worker he pays ₹30 per hour and to an unskilled worker ₹24 per hour. The average wage per hour (in ₹) paid by the contractor is:

A. 32

B. 27

C. 29 ✓

D. 25

Q12 Mathematics

Select the correct option.

A. The diagonals of a square are equal and do not bisect each other.

B. The diagonals of a square are not equal and do not bisect each other.

C. The diagonals of a square are not equal and bisect each other.

D. The diagonals of a square are equal and bisect each other. ✓

Q13 Mathematics

P and Q can complete a piece of work in 20 days and 30 days, respectively. They decide to work alternatively; one day P and next day Q, until the job is finished. How many days will it take for the work to be completed, if P starts the work?

A. 18 days

B. 24 days ✓

C. 25 days

D. 21 days

Q14 Mathematics

20% of a number is more than 20% of 620 by 160. The number is:

A. 1420 ✓

B. 1520

C. 1270

D. 1470

Q15 Mathematics

The average of the marks of 16 students in a class is 56. If the marks of each student are doubled, find the new average.

A. 16

B. 112 ✓

C. 56

D. 32

Q16 Mathematics

Arjun has ₹1394 with him. He divides this amount between his two sons, Kartik and Ishan, and asks them to invest their respective shares at a compound interest rate of 5% per annum, compounded annually. It is observed that Kartik's investment amounts to the same value after 17 years as Ishan's investment does after 18 years. How much (in ₹) did Arjun give to Ishan?

A. 714

B. 530

C. 680 ✓

D. 814

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Q17 Mathematics

In what duration (in years) will ₹9,000 fetch a simple interest of ₹720 at 4% per annum rate of interest?

A. 4

B. 2 ✓

C. 1

D. 3

Q18 Mathematics

The price of each article of type P, Q, and R is ₹280, ₹180 and ₹115, respectively. Ranu buys articles of each type in the ratio 4 : 4 : 3 for ₹6,555. How many articles of type Q did he purchase?

A. 9

B. 20

C. 18

D. 12 ✓

Q19 Mathematics

Form the quadratic equation whose roots are 3 and −2.

A. $x^2 + x - 6 = 0$

B. $x^2 + x + 6 = 0$

C. $x^2 - x - 6 = 0$ ✓

D. $x^2 - x + 6 = 0$

Q20 Mathematics

What value must be assigned to A so that the 8-digit number 493A9132 is divisible by 9?

A. 9

B. 2

C. 5 ✓

D. 7

Q21 Mathematics

A shopkeeper purchased 67 dozens of articles at the rate of ₹300 per dozen. He sold each one of them at the rate of ₹34. What percentage profit did he make?

A. 34%

B. 36% ✓

C. 38%

D. 37%

Q22 Mathematics

Solve the following system of 3 equations in 3 unknowns.

$2x + y - 3z = -4$
$4x - 2y + z = 9$
$3x + 5y - 2z = 5$

A. $x = 2, y = -1, z = -3$

B. $x = -2, y = -1, z = 3$

C. $x = -2, y = 1, z = 3$

D. $x = 2, y = 1, z = 3$ ✓

Q23 Mathematics

A solid cone is cut into two pieces (a smaller cone and a frustum) of equal volume by making a cut parallel to its flat surface. The height of the small cone is equal to the diameter of the bigger flat area of the frustum. The radius of the small cone is ____ times its height.

A. $\frac{1}{2\sqrt[3]{3}}$

B. $\frac{1}{2\sqrt[3]{2}}$ ✓

C. $\frac{1}{3\sqrt[3]{3}}$

D. $\frac{1}{\sqrt[3]{2}}$

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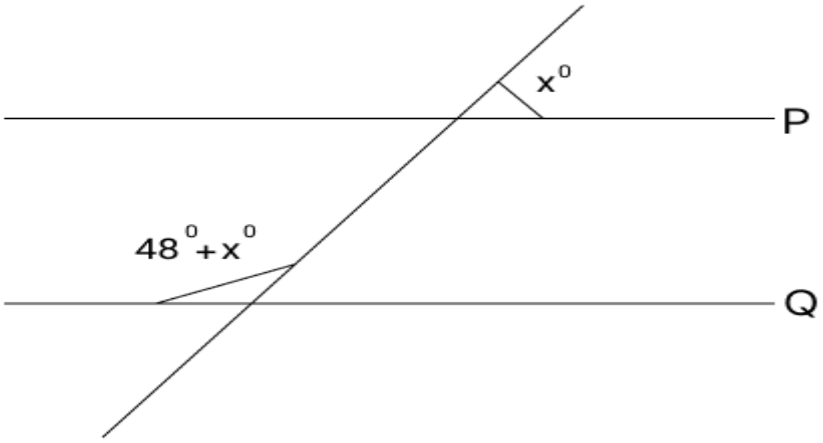
Q24 Mathematics

Find the value of y, satisfying $12 \times 3 \times 940 \div \sqrt{2209} = y + 716$

- A. 4 ✓
- B. 0
- C. -6
- D. 3

Q25 Mathematics

In the given figure, find the value of x if P || Q is given.



- A. 68
- B. 66 ✓
- C. 72
- D. 70

Q26 Mathematics

If $p^2 + 3p = 3$, then the value of $(p+4)^3 + \frac{1}{(p+4)^3}$ is:

- A. 55
- B. 52
- C. 110 ✓
- D. 104

Q27 Mathematics

What is the value of $\text{cosec}^2 63° + 3\sec^2 56° - 3\cot^2 34° - \tan^2 27°$?

- A. 2
- B. 4 ✓
- C. 3
- D. 1

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Q28 Mathematics

Boat A, whose speed in still water is 10 km/h, goes downstream from city P to city Q in 3 hours. Boat B goes from city Q to city P in 5 hours. What will be the time taken (in hours) by boat B to travel from city P to city Q, if the speed of the stream is 5 km/h?

A. 4

B. $2\frac{7}{19}$ ✓

C. 3

D. $3\frac{4}{15}$

Q29 Mathematics

The area of a square is 5184 cm^2. Its perimeter is equal to the perimeter of a regular hexagon. What is the area (in cm^2) of the hexagon?

A. 3472

B. 3434

C. $3432\sqrt{3}$

D. $3456\sqrt{3}$ ✓

Q30 Mathematics

If the mean of the following data is 45, find the value of X.

Class	20-30	30-40	40-50	50-60	60-70
Frequency	49	19	25	21	X

A. 42

B. 48 ✓

C. 26

D. 32

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