

YASASVI Mathematics

Sample Paper – 3

Duration: 45 Minutes

Maximum Marks: 120

Instructions

- This paper contains **30** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics portion of YASASVI entrance.
- Each correct answer carries **+4 marks**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **Class 8 NCERT — Number System, Algebra, Geometry, Mensuration, Data Handling**.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. Simplify: $\frac{-3}{4} + \frac{5}{8} - \frac{1}{2}$

(A) $\frac{3}{8}$

(B) $-\frac{3}{8}$

(C) $-\frac{5}{8}$

(D) $\frac{5}{8}$

Q2. What is the value of $2^{-3} \times 4^2$ in its simplest form?

(A) $\frac{1}{2}$

(B) 4

(C) 1

(D) 2

Q3. Two bells ring every 18 minutes and 24 minutes respectively. If they ring together at 9:00 AM, when will they next ring together?



- (A) 10:12 AM (B) 10:18 AM
(C) 10:24 AM (D) 10:30 AM

Q4. Find the mean proportional between 9 and 25.

- (A) 12 (B) 15
(C) 17 (D) 20

Q5. 30% of a number is 54. What is that number?

- (A) 162 (B) 170
(C) 180 (D) 190

Q6. An article is bought for Rs 250 and sold for Rs 310. Find the profit percentage.

- (A) 20% (B) 21%
(C) 22% (D) 24%

Q7. Two successive discounts of 10% and 5% are offered on an article. What is the effective single equivalent discount?

- (A) 14.5% (B) 15%
(C) 14% (D) 13.5%

Q8. An article is sold at a loss of 8%. Had it been sold for Rs 40 more, there would have been a profit of 12%. Find the cost price of the article.

- (A) Rs 180 (B) Rs 200
(C) Rs 220 (D) Rs 250

Q9. Find the principal if Simple Interest = Rs 450, Rate = 9% per annum, and Time = 2 years.



(A) Rs 2000

(B) Rs 2200

(C) Rs 2500

(D) Rs 3000

Q10. Find the difference between Compound Interest and Simple Interest for 2 years on a principal of Rs 10,000 at 5% per annum.

(A) Rs 20

(B) Rs 50

(C) Rs 100

(D) Rs 25

Q11. Find the average of: 8, 12, 16, 20, 24, 28, 32.

(A) 20

(B) 18

(C) 22

(D) 24

Q12. Pipe A can fill a tank in 12 hours and Pipe B can empty it in 18 hours. If both pipes are opened simultaneously, how long will it take to fill the tank?

(A) 24 hours

(B) 36 hours

(C) 48 hours

(D) 30 hours

Q13. A works twice as fast as B. Together they finish a piece of work in 12 days. In how many days can B alone complete the work?

(A) 24 days

(B) 30 days

(C) 36 days

(D) 48 days

Q14. A car travels the first 120 km at 60 km/h and the next 120 km at 40 km/h. Find the average speed for the entire journey.

(A) 50 km/h

(B) 45 km/h

(C) 52 km/h

(D) 48 km/h



Q15. A 200 m long train crosses a bridge 400 m long at a speed of 90 km/h. Find the time taken to cross the bridge completely.

- (A) 24 seconds (B) 20 seconds
(C) 28 seconds (D) 30 seconds

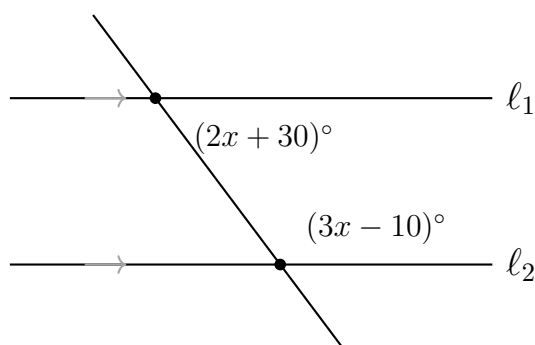
Q16. Three times a number minus 14 equals twice the number plus 11. Find the number.

- (A) 20 (B) 25
(C) 30 (D) 35

Q17. If $x + \frac{1}{x} = 5$, find the value of $x^2 + \frac{1}{x^2}$.

- (A) 21 (B) 27
(C) 23 (D) 25

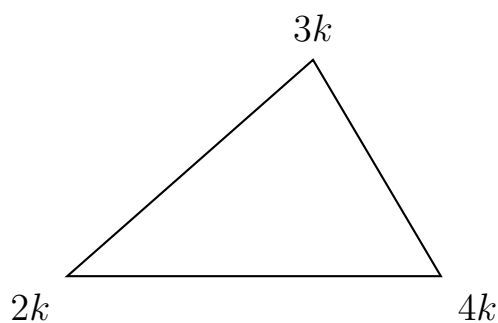
Q18. In the figure below, $\ell_1 \parallel \ell_2$ and a transversal crosses both lines. The co-interior (same-side interior) angles are $(2x + 30)^\circ$ and $(3x - 10)^\circ$. Find the value of x .



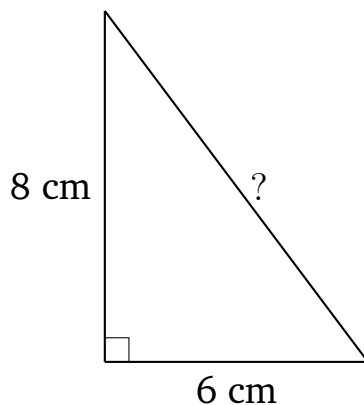
- (A) 28 (B) 30
(C) 34 (D) 32

Q19. The angles of a triangle are in the ratio 2 : 3 : 4. Find the largest angle.



(A) 80° (B) 60° (C) 90° (D) 100°

Q20. In a right-angled triangle, the two legs are 6 cm and 8 cm. Find the length of the hypotenuse.



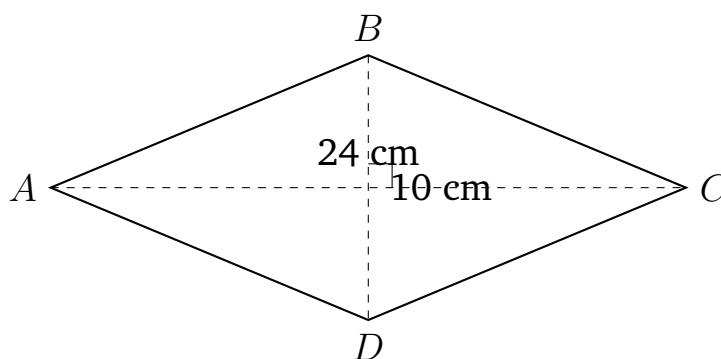
(A) 8 cm

(B) 10 cm

(C) 12 cm

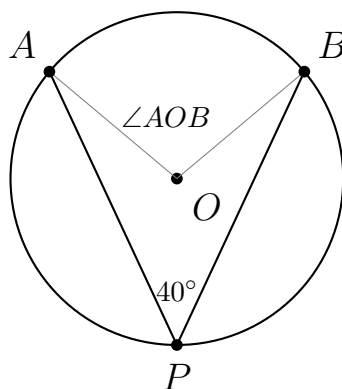
(D) 14 cm

Q21. One diagonal of rhombus $ABCD$ is 24 cm and the other diagonal is 10 cm. Find the length of each side of the rhombus.



- (A) 10 cm (B) 12 cm
(C) 13 cm (D) 15 cm

Q22. An inscribed angle $\angle APB = 40^\circ$ is drawn in a circle with centre O , where A and B are points on the circle. Find the central angle $\angle AOB$ subtended by the same arc.



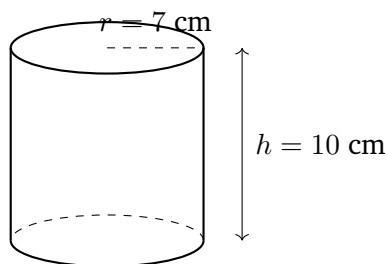
- (A) 40° (B) 20°
(C) 60° (D) 80°

Q23. Find the area of a parallelogram with base 12 cm and height 7.5 cm.

- (A) 90 cm^2 (B) 80 cm^2
(C) 95 cm^2 (D) 100 cm^2

Q24. Find the volume of a cylinder with radius 7 cm and height 10 cm.

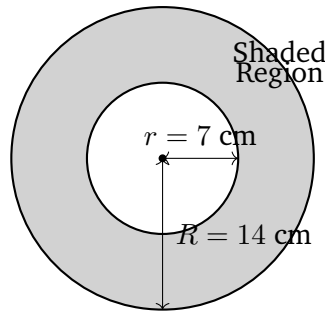
(Use $\pi = \frac{22}{7}$)



- (A) 1440 cm^3 (B) 1540 cm^3
(C) 1640 cm^3 (D) 1740 cm^3



- Q25.** Find the area of the ring (annulus) between two concentric circles with outer radius 14 cm and inner radius 7 cm.
(Use $\pi = \frac{22}{7}$)



- (A) 308 cm^2 (B) 385 cm^2
(C) 462 cm^2 (D) 539 cm^2
- Q26.** Find the median of the following data: 7, 15, 3, 24, 17, 9, 8.
- (A) 8 (B) 15
(C) 7 (D) 9
- Q27.** In a pie chart, the sector angle for “Sports” is 90° . What fraction of students prefer Sports?
- (A) $\frac{1}{4}$ (B) $\frac{1}{3}$
(C) $\frac{3}{4}$ (D) $\frac{1}{2}$
- Q28.** A bag contains 3 red, 5 blue, and 2 green marbles. One marble is picked at random. What is the probability that it is blue?
- (A) $\frac{1}{3}$ (B) $\frac{1}{2}$
(C) $\frac{3}{10}$ (D) $\frac{1}{5}$
- Q29.** Find the sum of the first 15 natural numbers using the formula $\frac{n(n+1)}{2}$.



(A) 100

(B) 110

(C) 120

(D) 130

Q30. A vendor buys 3 items for Rs 20 and sells 2 items for Rs 20. Find the profit percentage.

(A) 25%

(B) $33.\bar{3}\%$

(C) 40%

(D) 50%



Detailed Solutions

Q1.

Solution

Convert all fractions to a common denominator of 8:

$$\frac{-3}{4} + \frac{5}{8} - \frac{1}{2} = \frac{-6}{8} + \frac{5}{8} - \frac{4}{8} = \frac{-6 + 5 - 4}{8} = \frac{-5}{8}$$

Answer: (C)

Q2.

Solution

Apply the laws of exponents: $4^2 = (2^2)^2 = 2^4 = 16$ and $2^{-3} = \frac{1}{8}$.

$$2^{-3} \times 4^2 = \frac{1}{8} \times 16 = \frac{16}{8} = 2$$

Answer: (D)

Q3.

Solution

Find the LCM of 18 and 24:

$$18 = 2 \times 3^2, \quad 24 = 2^3 \times 3$$

$$\text{LCM} = 2^3 \times 3^2 = 8 \times 9 = 72 \text{ minutes}$$

Starting at 9:00 AM, add 72 minutes: 9:00 AM + 60 min = 10:00 AM; 10:00 AM + 12 min = 10:12 AM.

Answer: (A)

Q4.

Solution

The mean proportional between two numbers a and b is $\sqrt{ab}$.

$$\text{Mean proportional} = \sqrt{9 \times 25} = \sqrt{225} = 15$$

Answer: (B)

Q5.



Solution

Let the number be N .

$$\frac{30}{100} \times N = 54 \implies N = \frac{54 \times 100}{30} = 180$$

Answer: (C)

Q6.

Solution

$$\text{Profit} = \text{SP} - \text{CP} = 310 - 250 = \text{Rs } 60$$

$$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100 = \frac{60}{250} \times 100 = 24\%$$

Answer: (D)

Q7.

Solution

For two successive discounts $d_1 = 10\%$ and $d_2 = 5\%$, the effective single discount is:

$$d = d_1 + d_2 - \frac{d_1 \times d_2}{100} = 10 + 5 - \frac{10 \times 5}{100} = 15 - 0.5 = 14.5\%$$

Answer: (A)

Q8.

Solution

Let Cost Price = Rs x .

SP at 8% loss = $0.92x$; SP at 12% profit = $1.12x$.

Given the difference is Rs 40:

$$1.12x - 0.92x = 40 \implies 0.20x = 40 \implies x = \frac{40}{0.20} = \text{Rs } 200$$

Answer: (B)

Q9.

Solution

Using $\text{SI} = \frac{P \times R \times T}{100}$, solve for P :

$$P = \frac{\text{SI} \times 100}{R \times T} = \frac{450 \times 100}{9 \times 2} = \frac{45000}{18} = \text{Rs } 2500$$

Answer: (C)



Q10.

Solution**Simple Interest:**

$$SI = \frac{P \times R \times T}{100} = \frac{10000 \times 5 \times 2}{100} = \text{Rs } 1000$$

Compound Interest:

$$CI = P \left[\left(1 + \frac{R}{100} \right)^T - 1 \right] = 10000 [(1.05)^2 - 1] = 10000 \times 0.1025 = \text{Rs } 1025$$

Difference = $1025 - 1000 = \text{Rs } 25$.**Answer: (D)**

Q11.

SolutionSum = $8 + 12 + 16 + 20 + 24 + 28 + 32 = 140$. Number of terms = 7.

$$\text{Average} = \frac{140}{7} = 20$$

(These 7 numbers are in AP; the average equals the middle term, which is 20.)

Answer: (A)

Q12.

SolutionPipe A fills $\frac{1}{12}$ of the tank per hour; Pipe B empties $\frac{1}{18}$ per hour.

Net filling rate when both are open:

$$\frac{1}{12} - \frac{1}{18} = \frac{3}{36} - \frac{2}{36} = \frac{1}{36} \text{ per hour}$$

Time to fill the tank = **36 hours**.**Answer: (B)**

Q13.

SolutionA works twice as fast as B. Let B take $2k$ days; then A takes k days.

Together they complete the work in 12 days:

$$\frac{1}{k} + \frac{1}{2k} = \frac{1}{12} \Rightarrow \frac{3}{2k} = \frac{1}{12} \Rightarrow 2k = 36$$



B alone takes $2k = 36$ days.

Answer: (C)

Q14.

Solution

For equal distances at different speeds, average speed $= \frac{2 v_1 v_2}{v_1 + v_2}$:

$$\text{Average speed} = \frac{2 \times 60 \times 40}{60 + 40} = \frac{4800}{100} = 48 \text{ km/h}$$

Answer: (D)

Q15.

Solution

Total distance to be covered = length of train + length of bridge = $200 + 400 = 600$ m.

$$\text{Speed} = 90 \text{ km/h} = 90 \times \frac{1000}{3600} = 25 \text{ m/s.}$$

$$\text{Time} = \frac{600}{25} = 24 \text{ seconds}$$

Answer: (A)

Q16.

Solution

Let the number be x .

$$3x - 14 = 2x + 11 \implies 3x - 2x = 11 + 14 \implies x = 25$$

Answer: (B)

Q17.

Solution

Use the identity $\left(x + \frac{1}{x}\right)^2 = x^2 + 2 + \frac{1}{x^2}$:

$$5^2 = x^2 + 2 + \frac{1}{x^2} \implies 25 - 2 = x^2 + \frac{1}{x^2} \implies x^2 + \frac{1}{x^2} = 23$$

Answer: (C)

Q18.



Solution

Co-interior angles (same-side interior angles) between parallel lines are **supplementary** — they add up to 180° .

$$(2x + 30)^\circ + (3x - 10)^\circ = 180^\circ$$

$$5x + 20 = 180 \implies 5x = 160 \implies x = 32$$

Answer: (D)

Q19.

Solution

Let the angles be $2k$, $3k$, and $4k$.

By the angle sum property of a triangle:

$$2k + 3k + 4k = 180^\circ \implies 9k = 180^\circ \implies k = 20^\circ$$

The three angles are 40° , 60° , and 80° .

The **largest angle** = 80° .

Answer: (A)

Q20.

Solution

By the Pythagorean theorem, with legs $a = 6$ cm and $b = 8$ cm:

$$\text{Hypotenuse} = \sqrt{a^2 + b^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10 \text{ cm}$$

(This is the classic 3-4-5 Pythagorean triple scaled by 2.)

Answer: (B)

Q21.

Solution

The diagonals of a rhombus bisect each other at right angles.

Half-diagonals: $\frac{24}{2} = 12$ cm and $\frac{10}{2} = 5$ cm.

Each side of the rhombus is the hypotenuse of a right triangle with legs 12 and 5:

$$\text{Side} = \sqrt{12^2 + 5^2} = \sqrt{144 + 25} = \sqrt{169} = 13 \text{ cm}$$

Answer: (C)

Q22.



Solution

By the **Inscribed Angle Theorem**, the central angle is twice the inscribed angle subtending the same arc.

$$\angle AOB = 2 \times \angle APB = 2 \times 40^\circ = 80^\circ$$

Answer: (D)

Q23.

Solution

$$\text{Area of parallelogram} = \text{base} \times \text{height} = 12 \times 7.5 = 90 \text{ cm}^2$$

Answer: (A)

Q24.

Solution

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times 7^2 \times 10 = \frac{22}{7} \times 49 \times 10 = 22 \times 7 \times 10 = 1540 \text{ cm}^3$$

Answer: (B)

Q25.

Solution

Area of ring = $\pi(R^2 - r^2)$, where $R = 14 \text{ cm}$ and $r = 7 \text{ cm}$:

$$= \frac{22}{7}(14^2 - 7^2) = \frac{22}{7}(196 - 49) = \frac{22}{7} \times 147 = 22 \times 21 = 462 \text{ cm}^2$$

Answer: (C)

Q26.

Solution

Arrange the data in ascending order:

$$3, 7, 8, 9, 15, 17, 24$$

Number of values = 7 (odd). Median = the 4th value = 9.

Answer: (D)

Q27.



Solution

The fraction of students who prefer Sports equals the ratio of the sector angle to the full circle:

$$\text{Fraction} = \frac{\text{Sector angle}}{360^\circ} = \frac{90^\circ}{360^\circ} = \frac{1}{4}$$

Answer: (A)

Q28.

Solution

Total marbles = $3 + 5 + 2 = 10$.

Number of blue marbles = 5.

$$P(\text{blue}) = \frac{5}{10} = \frac{1}{2}$$

Answer: (B)

Q29.

Solution

Using the formula for the sum of the first n natural numbers:

$$S = \frac{n(n+1)}{2} = \frac{15 \times 16}{2} = \frac{240}{2} = 120$$

Answer: (C)

Q30.

Solution

Cost Price per item: Buy 3 items for Rs 20 $\Rightarrow$ CP = $\frac{20}{3}$ per item.

Selling Price per item: Sell 2 items for Rs 20 $\Rightarrow$ SP = $\frac{20}{2} = 10$ per item.

Profit per item:

$$\text{Profit} = 10 - \frac{20}{3} = \frac{30 - 20}{3} = \frac{10}{3}$$

Profit%:

$$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100 = \frac{10/3}{20/3} \times 100 = \frac{10}{20} \times 100 = 50\%$$

Answer: (D)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	D	3	A	4	B	5	C
6	D	7	A	8	B	9	C	10	D
11	A	12	B	13	C	14	D	15	A
16	B	17	C	18	D	19	A	20	B
21	C	22	D	23	A	24	B	25	C
26	D	27	A	28	B	29	C	30	D

