

YASASVI Mathematics

Sample Paper – 5

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. Which of the following is an irrational number?

- (A) 0.5
- (B) $\sqrt{5}$
- (C) $\frac{3}{4}$
- (D) $\sqrt{9}$

Q2. Find the value of 5^{-2} .

- (A) 25
- (B) -25
- (C) $\frac{1}{25}$
- (D) $-\frac{1}{25}$



- Q3.** The HCF and LCM of two numbers are 8 and 96 respectively. If one number is 24, find the other.
- (A) 24
(B) 48
(C) 16
(D) 32
- Q4.** Find the mean proportional between 4 and 16.
- (A) 8
(B) 10
(C) 6
(D) 12
- Q5.** The population of a town is 40,000. It increases by 5% in one year. What is the new population?
- (A) 41,000
(B) 42,000
(C) 44,000
(D) 45,000
- Q6.** A bicycle bought for Rs 1,200 is sold at a loss of 15%. What is the selling price?
- (A) Rs 1,080
(B) Rs 990
(C) Rs 1,020



(D) Rs 1,050

Q7. A dishonest dealer uses an 800 g weight for 1 kg and sells at cost price. Find the profit percentage.

(A) 15%

(B) 20%

(C) 22%

(D) 25%

Q8. A person buys 3 items for Rs 1,200 total. He sells them at a combined profit of 25%. Find the total selling price.

(A) Rs 1,500

(B) Rs 1,400

(C) Rs 1,600

(D) Rs 1,350

Q9. At what rate per annum will Rs 5,000 yield Rs 7,000 in 4 years under simple interest?

(A) 8%

(B) 10%

(C) 12%

(D) 9%

Q10. The SI on Rs 4,000 for 2 years at 5% per annum is Rs 400. Find the compound interest for the same principal, rate, and time.



- (A) Rs 400
- (B) Rs 405
- (C) Rs 410
- (D) Rs 420

Q11. In a class of 30 boys and 20 girls, the boys' average marks are 60 and the girls' average marks are 70. Find the average marks of the entire class.

- (A) 65
- (B) 62
- (C) 63
- (D) 64

Q12. A can do a job in 12 days and B can do it in 6 days. B works for 2 days and then leaves. How many more days does A take to finish the remaining work?

- (A) 8 days
- (B) 6 days
- (C) 10 days
- (D) 4 days

Q13. A tap fills a tank in 6 hours; a drain empties it in 10 hours. With both open simultaneously, how long will it take to fill the tank?

- (A) 12 hours
- (B) 15 hours



- (C) 18 hours
- (D) 20 hours

Q14. A car travels from A to B at 40 km/h and returns at 60 km/h.
Find the average speed for the entire round trip.

- (A) 44 km/h
- (B) 46 km/h
- (C) 48 km/h
- (D) 50 km/h

Q15. A train 300 m long crosses a 200 m platform in 25 seconds.
Find the speed of the train in km/h.

- (A) 60 km/h
- (B) 64 km/h
- (C) 68 km/h
- (D) 72 km/h

Q16. If $x + y = 10$ and $x - y = 4$, find x .

- (A) 7
- (B) 3
- (C) 5
- (D) 6

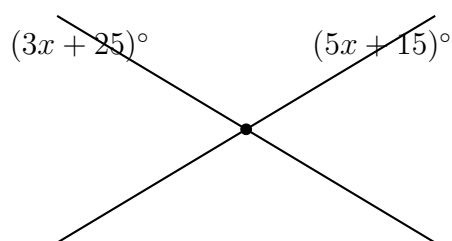
Q17. Expand: $(a + 3)^2$

- (A) $a^2 + 3a + 9$



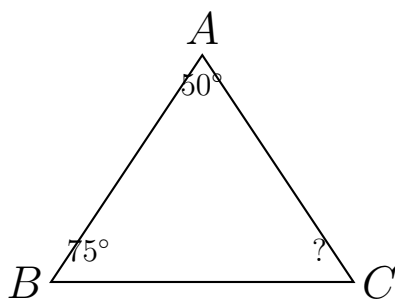
- (B) $a^2 + 6a + 9$
- (C) $a^2 + 6a + 6$
- (D) $a^2 + 9a + 9$

Q18. Two lines intersect at a point. The angles formed satisfy $(5x + 15)^\circ = (3x + 25)^\circ$ (vertically opposite). Find x .



- (A) 3
- (B) 4
- (C) 5
- (D) 6

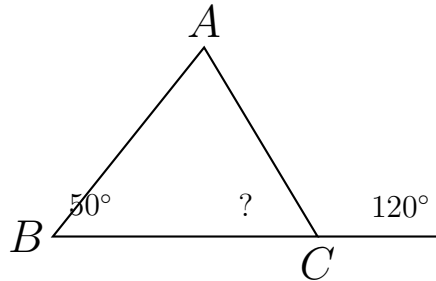
Q19. In the figure, in $\triangle ABC$, $\angle A = 50^\circ$ and $\angle B = 75^\circ$. Find $\angle C$.



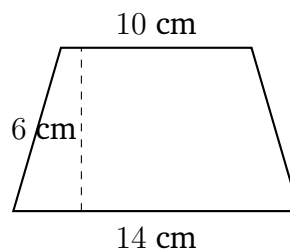
- (A) 45°
- (B) 50°
- (C) 60°
- (D) 55°



- Q20.** An exterior angle of a triangle is 120° and one non-adjacent interior angle is 50° . Find the other non-adjacent interior angle.

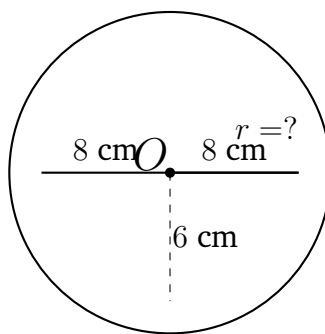


- (A) 70°
(B) 60°
(C) 80°
(D) 50°
- Q21.** Find the area of the trapezium shown with parallel sides 10 cm and 14 cm and height 6 cm.



- (A) 60 cm^2
(B) 72 cm^2
(C) 84 cm^2
(D) 90 cm^2
- Q22.** A chord of length 16 cm is at a distance of 6 cm from the centre of a circle. Find the radius.





- (A) 8 cm
- (B) 9 cm
- (C) 10 cm
- (D) 12 cm

Q23. Find the area of a square with perimeter 48 cm.

- (A) 100 cm^2
- (B) 121 cm^2
- (C) 169 cm^2
- (D) 144 cm^2

Q24. Find the total surface area of a cuboid with length 5 cm, breadth 4 cm, and height 3 cm.

- (A) 94 cm^2
- (B) 86 cm^2
- (C) 100 cm^2
- (D) 108 cm^2

Q25. Find the area of a semicircle with diameter 14 cm. (Use $\pi = \frac{22}{7}$)



- (A) 88 cm^2
- (B) 77 cm^2
- (C) 66 cm^2
- (D) 99 cm^2

Q26. Find the median of: 3, 7, 11, 13, 15, 20, 25.

- (A) 11
- (B) 12
- (C) 13
- (D) 15

Q27. In a pie chart, a sector spans 90° out of 360° . What percentage does this sector represent?

- (A) 20%
- (B) 22.5%
- (C) 28%
- (D) 25%

Q28. A fair coin is tossed twice. What is the probability of getting exactly one head?

- (A) $\frac{1}{2}$
- (B) $\frac{1}{4}$
- (C) $\frac{3}{4}$
- (D) $\frac{1}{3}$



Q29. Find the 10th term of the arithmetic sequence 3, 7, 11, 15, ...

(A) 35

(B) 39

(C) 43

(D) 37

Q30. A and B invest in a business in the ratio 3 : 5. The total profit is Rs 4,000. Find A's share.

(A) Rs 1,000

(B) Rs 1,200

(C) Rs 1,500

(D) Rs 2,500



Detailed Solutions

Solution

An irrational number cannot be expressed as $\frac{p}{q}$ where p, q are integers and $q \neq 0$.

- Q1.
- $0.5 = \frac{1}{2}$ — rational
 - $\sqrt{5}$ — not a perfect square, so irrational ✓
 - $\frac{3}{4}$ — rational
 - $\sqrt{9} = 3$ — rational (perfect square)

Therefore $\sqrt{5}$ is irrational.

Answer: (B)

Q2.

Solution

By the law of negative exponents, $a^{-n} = \frac{1}{a^n}$:

$$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$$

Answer: (C)

Q3.

Solution

Using the relation: $\text{HCF} \times \text{LCM} = \text{Product of the two numbers}$

$$8 \times 96 = 24 \times \text{other number}$$

$$\text{Other number} = \frac{8 \times 96}{24} = \frac{768}{24} = 32$$

Answer: (D)

Q4.

Solution

The mean proportional between a and b is $\sqrt{a \times b}$.

$$\text{Mean proportional} = \sqrt{4 \times 16} = \sqrt{64} = 8$$



Answer: (A)**Q5.****Solution**

$$\text{New population} = \text{Original population} \times \left(1 + \frac{\text{Rate}}{100}\right)$$

$$\text{New population} = 40,000 \times 1.05 = 42,000$$

Answer: (B)**Q6.****Solution**

Given: CP = Rs 1,200, Loss = 15%

$$\text{SP} = \text{CP} \times \left(1 - \frac{\text{Loss}\%}{100}\right) = 1200 \times \left(1 - \frac{15}{100}\right) = 1200 \times 0.85 = \text{Rs } 1,020$$

Answer: (C)**Q7.****Solution**

The dealer gives only 800 g but charges for 1000 g (1 kg).

$$\text{Profit} = 1000 - 800 = 200 \text{ g (on an outlay of 800 g)}$$

$$\text{Profit}\% = \frac{200}{800} \times 100 = 25\%$$

Answer: (D)**Q8.****Solution**

Total CP = Rs 1,200

Profit = 25%, so:

$$\text{Total SP} = 1200 \times \left(1 + \frac{25}{100}\right) = 1200 \times 1.25 = \text{Rs } 1,500$$

Answer: (A)**Q9.**

Solution

$$\text{Simple Interest} = 7000 - 5000 = \text{Rs } 2000$$

$$\text{Formula: } R = \frac{\text{SI} \times 100}{P \times T}$$

$$R = \frac{2000 \times 100}{5000 \times 4} = \frac{200000}{20000} = 10\%$$

Answer: (B)**Q10.****Solution**

$$\text{Compound Interest formula: } \text{CI} = P \left(1 + \frac{R}{100} \right)^T - P$$

$$\text{CI} = 4000 \times (1.05)^2 - 4000$$

$$(1.05)^2 = 1.1025$$

$$\text{CI} = 4000 \times 1.1025 - 4000 = 4410 - 4000 = \text{Rs } 410$$

$$(\text{Note: } \text{SI} = \frac{4000 \times 5 \times 2}{100} = \text{Rs } 400; \text{ CI exceeds SI by Rs } 10 \text{ due to compounding.})$$

Answer: (C)**Q11.****Solution**

$$\text{Total marks of boys} = 30 \times 60 = 1800$$

$$\text{Total marks of girls} = 20 \times 70 = 1400$$

$$\text{Total marks} = 1800 + 1400 = 3200; \text{ Total students} = 30 + 20 = 50$$

$$\text{Class average} = \frac{3200}{50} = 64$$

Answer: (D)**Q12.****Solution**

$$\text{B's work rate} = \frac{1}{6} \text{ (job per day).}$$

$$\text{Work done by B in 2 days} = \frac{2}{6} = \frac{1}{3}$$



$$\text{Remaining work} = 1 - \frac{1}{3} = \frac{2}{3}$$

$$\text{A's work rate} = \frac{1}{12} \text{ (job per day).}$$

$$\text{Days for A to finish remaining work} = \frac{2/3}{1/12} = \frac{2}{3} \times 12 = 8 \text{ days.}$$

Answer: (A)

Q13.

Solution

$$\text{Filling rate of tap} = \frac{1}{6} \text{ (tank per hour)}$$

$$\text{Emptying rate of drain} = \frac{1}{10} \text{ (tank per hour)}$$

$$\text{Net filling rate (both open)} = \frac{1}{6} - \frac{1}{10}$$

LCM of 6 and 10 is 30:

$$= \frac{5}{30} - \frac{3}{30} = \frac{2}{30} = \frac{1}{15}$$

Time to fill the tank = 15 hours.

Answer: (B)

Q14.

Solution

For a round trip at speeds v_1 and v_2 , the average speed is the harmonic mean:

$$\text{Average speed} = \frac{2v_1v_2}{v_1 + v_2} = \frac{2 \times 40 \times 60}{40 + 60} = \frac{4800}{100} = 48 \text{ km/h}$$

Answer: (C)

Q15.

Solution

Total distance covered = Length of train + Length of platform = $300 + 200 = 500$ m

Time taken = 25 seconds

$$\text{Speed} = \frac{500}{25} = 20 \text{ m/s}$$

Converting to km/h: $20 \times \frac{18}{5} = 72 \text{ km/h.}$



Answer: (D)**Q16.****Solution**

Add the two equations:

$$(x + y) + (x - y) = 10 + 4$$

$$2x = 14 \implies x = 7$$

Verification: $y = 10 - 7 = 3$; $x - y = 7 - 3 = 4$ ✓**Answer: (A)****Q17.****Solution**Use the identity $(a + b)^2 = a^2 + 2ab + b^2$ with $a = a$ and $b = 3$:

$$(a + 3)^2 = a^2 + 2 \cdot a \cdot 3 + 3^2 = a^2 + 6a + 9$$

Answer: (B)**Q18.****Solution**

Vertically opposite angles are equal:

$$5x + 15 = 3x + 25$$

$$5x - 3x = 25 - 15$$

$$2x = 10 \implies x = 5$$

Verification: $(5 \times 5 + 15)^\circ = 40^\circ$; $(3 \times 5 + 25)^\circ = 40^\circ$ ✓**Answer: (C)****Q19.****Solution**

By the angle sum property of a triangle:

$$\angle A + \angle B + \angle C = 180^\circ$$

$$50^\circ + 75^\circ + \angle C = 180^\circ$$

$$\angle C = 180^\circ - 125^\circ = 55^\circ$$



Answer: (D)**Q20.****Solution**

By the Exterior Angle Theorem, an exterior angle of a triangle equals the sum of the two non-adjacent interior angles:

$$\text{Exterior angle} = \text{Interior angle 1} + \text{Interior angle 2}$$

$$120^\circ = 50^\circ + \text{other interior angle}$$

$$\text{Other interior angle} = 120^\circ - 50^\circ = 70^\circ$$

Answer: (A)**Q21.****Solution**

Area of a trapezium = $\frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height}$

$$\text{Area} = \frac{1}{2} \times (10 + 14) \times 6 = \frac{1}{2} \times 24 \times 6 = 72 \text{ cm}^2$$

Answer: (B)**Q22.****Solution**

The perpendicular from the centre to a chord bisects the chord.

Half-chord = $\frac{16}{2} = 8$ cm; perpendicular distance = 6 cm.

By the Pythagorean theorem:

$$r^2 = 8^2 + 6^2 = 64 + 36 = 100$$

$$r = \sqrt{100} = 10 \text{ cm}$$

Answer: (C)**Q23.****Solution**

Perimeter of square = $4 \times \text{side}$

$$\text{Side} = \frac{48}{4} = 12 \text{ cm}$$



$$\text{Area} = \text{side}^2 = 12^2 = 144 \text{ cm}^2$$

Answer: (D)

Q24.

Solution

Total Surface Area of a cuboid $= 2(lb + bh + lh)$

With $l = 5 \text{ cm}$, $b = 4 \text{ cm}$, $h = 3 \text{ cm}$:

$$lb = 5 \times 4 = 20 \text{ cm}^2$$

$$bh = 4 \times 3 = 12 \text{ cm}^2$$

$$lh = 5 \times 3 = 15 \text{ cm}^2$$

$$\text{TSA} = 2(20 + 12 + 15) = 2 \times 47 = 94 \text{ cm}^2$$

Answer: (A)

Q25.

Solution

Diameter $= 14 \text{ cm}$, so radius $r = 7 \text{ cm}$.

$$\text{Area of a full circle} = \pi r^2 = \frac{22}{7} \times 7^2 = \frac{22}{7} \times 49 = 22 \times 7 = 154 \text{ cm}^2$$

$$\text{Area of semicircle} = \frac{154}{2} = 77 \text{ cm}^2$$

Answer: (B)

Q26.

Solution

Arrange the data in ascending order: 3, 7, 11, 13, 15, 20, 25

Total values $= 7$ (odd). Median $=$ middle value $= 4\text{th value}$.

$$\text{Median} = 13$$

Answer: (C)

Q27.

Solution

The full pie chart is $360^\circ = 100\%$.

$$\text{Percentage} = \frac{90}{360} \times 100 = \frac{1}{4} \times 100 = 25\%$$



Answer: (D)**Q28.****Solution**

Sample space for two coin tosses: $\{HH, HT, TH, TT\}$ — 4 equally likely outcomes.

Outcomes with exactly one head: $\{HT, TH\}$ — 2 outcomes.

$$P(\text{exactly one head}) = \frac{2}{4} = \frac{1}{2}$$

Answer: (A)**Q29.****Solution**

The sequence 3, 7, 11, 15, ... is an AP with first term $a = 3$ and common difference $d = 4$.

$$a_n = a + (n - 1)d$$

$$a_{10} = 3 + (10 - 1) \times 4 = 3 + 36 = 39$$

Answer: (B)**Q30.****Solution**

A and B invest in ratio 3 : 5. Total parts = $3 + 5 = 8$.

$$A's \text{ share} = \frac{3}{8} \times 4000 = \frac{12000}{8} = \text{Rs } 1,500$$

Answer: (C)

Answer Key

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

