YASASVI Mathematics

Sample Paper – 9

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. What is the additive inverse of $\frac{-5}{8}$?

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

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

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

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

Q2. If $2^x = 128$, find x.

(A) 5

(B) 6

(C) 7

(D) 8

Q3. A rectangular floor is 6 m long and 4 m wide. What is the side length of the largest square tile that fits the floor exactly?

(A) 50 cm

(B) 100 cm

(C) 150 cm

(D) 200 cm

Q4. The ages of A and B are in the ratio $5 : 7$. Five years later, the ratio will be $3 : 4$. Find A's present age.

(A) 25 years

(B) 20 years

(C) 30 years

(D) 35 years

Q5. A salesman earns a commission of 8% on his sales. If he earns Rs 2,400 in commission, find the total value of his sales.

(A) Rs 24,000

(B) Rs 30,000

(C) Rs 36,000

(D) Rs 28,000

Q6. A shopkeeper sells 25 pens at the cost price of 30 pens. Find

the profit percentage.

(A) 15%

(B) 16%

(C) 20%

(D) 25%

Q7. A TV set is marked at Rs 15,000. After a 20% discount, the shopkeeper still incurs a 4% loss. Find the cost price of the TV set.

(A) Rs 11,500

(B) Rs 12,000

(C) Rs 12,200

(D) Rs 12,500

Q8. A man buys 3 items for Rs 1,200. 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. The difference between the simple interest for 6 years and 4 years on the same principal at 5% per annum is Rs 600. Find the principal.

(A) Rs 5,000

(B) Rs 6,000

(C) Rs 7,000

(D) Rs 8,000

Q10. The population of a city is 40,000. It grows at 5% per annum. What will be the population after 2 years?

(A) $42{,}000$

(B) $43{,}000$

(C) $44{,}100$

(D) $45{,}200$

Q11. The average of 6 numbers is 25. If one number is removed, the average of the remaining 5 numbers becomes 24. Find the removed number.

(A) 25

(B) 28

(C) 32

(D) 30

Q12. A and B can do a job in 30 and 20 days respectively. They work together for 5 days. What fraction of the work remains?

(A) $\frac{7}{12}$

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

(C) $\frac{5}{12}$

(D) $\frac{3}{4}$

Q13. A tap can fill a tank in 8 hours. Due to a leak at the bottom, the tank takes 10 hours to fill. How long will the leak alone take to empty a full tank?

(A) 30 hours

(B) 40 hours

(C) 50 hours

(D) 60 hours

Q14. Ravi walks at 4 km/h and reaches his office 20 minutes late. Walking at 6 km/h, he arrives 10 minutes early. Find the distance to his office.

(A) 4 km

(B) 5 km

(C) 6 km

(D) 8 km

Q15. A boat goes downstream in 2 hours and upstream in 3 hours over the same distance. If the speed of the stream is 5 km/h, find the distance.

(A) 40 km

(B) 50 km

(C) 55 km

(D) 60 km

Q16. A two-digit number is 4 times the sum of its digits. Adding 27 to the number reverses its digits. Find the number.

(A) 36

(B) 24

(C) 48

(D) 12

Q17. Find the value of $(x+y)^2-(x-y)^2$ when $x=5$ and $y=3$.

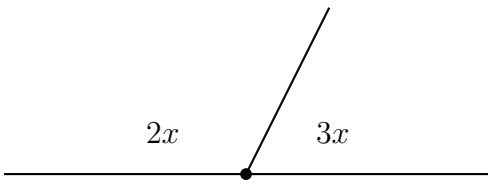
(A) 48

(B) 60

(C) 36

(D) 72

Q18. Two angles are in the ratio $2:3$ and together form a straight line. Find the measure of the larger angle.



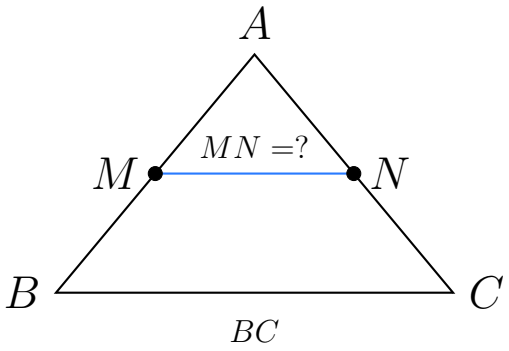
(A) 72°

(B) 90°

(C) 108°

(D) 120°

Q19. The line segment joining the midpoints of two sides of a triangle is parallel to the third side and equal to what fraction of the third side?



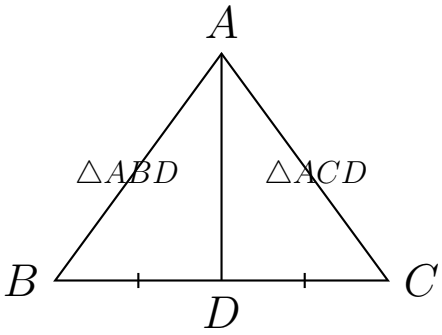
(A) Equal to the third side

(B) One-third of the third side

(C) Two-thirds of the third side

(D) Half of the third side

Q20. In triangle ABC, D is the midpoint of BC. What is the ratio of the area of $\triangle ABD$ to the area of $\triangle ABC$?



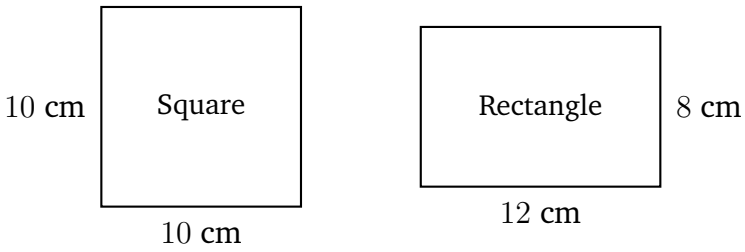
(A) $1 : 2$

(B) $1 : 3$

(C) $1 : 4$

(D) $2 : 3$

Q21. A rectangle and a square have the same perimeter of 40 cm. The rectangle has length 12 cm. Find the difference between the area of the square and the area of the rectangle.



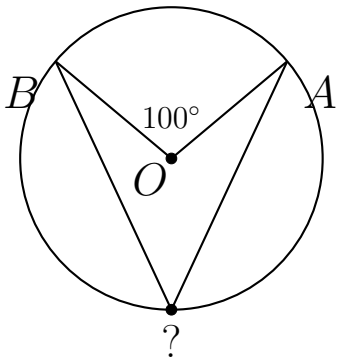
(A) 2 cm^2

(B) 4 cm^2

(C) 6 cm^2

(D) 8 cm^2

Q22. A central angle of a circle is 100°. What is the measure of the inscribed angle subtending the same arc?



(A) 100°

(B) 40°

(C) 50°

(D) 60°

Q23. A square field has a side of 40 m. A path 5 m wide runs outside the field all around. Find the area of the path.

(A) 700 m^2

(B) 800 m^2

(C) $850\ \text{m}^2$

(D) $900\ \text{m}^2$

Q24. Find the curved surface area of a cylinder with radius 7 cm and height 20 cm. (Use $\pi = \frac{22}{7}$)

(A) $880\ \text{cm}^2$

(B) $800\ \text{cm}^2$

(C) $920\ \text{cm}^2$

(D) $960\ \text{cm}^2$

Q25. Find the length of an arc subtending a central angle of 60° at the centre of a circle with radius 21 cm. (Use $\pi = \frac{22}{7}$)

(A) 18 cm

(B) 22 cm

(C) 26 cm

(D) 30 cm

Q26. Find the mean of the following data: $12,\ 18,\ 24,\ 30,\ 36$.

(A) 20

(B) 22

(C) 24

(D) 26

Q27. A frequency table shows scores: 10–20: 4 students, 20–30: 8 students, 30–40: 12 students, 40–50: 6 students. How many students scored 30 or above?

(A) 12

(B) 14

(C) 16

(D) 18

Q28. The probability of rain tomorrow is 0.35. What is the probability that it will **not** rain tomorrow?

(A) 0.65

(B) 0.55

(C) 0.75

(D) 0.45

Q29. Find the value of $1^2 + 2^2 + 3^2 + 4^2 + 5^2$.

(A) 50

(B) 55

(C) 60

(D) 65

Q30. A school bus carries 40 students. The bus fare per student is Rs 1,500 per year. What is the total fare collected from all students in a year?

(A) Rs 50,000

(B) Rs 55,000

(C) Rs 60,000

(D) Rs 65,000

Detailed Solutions

Q1.

Solution

The additive inverse of a number n is $-n$, i.e. the number that when added to n gives zero.

$$\frac{-5}{8} + x = 0 \implies x = \frac{5}{8}$$

The additive inverse of $\frac{-5}{8}$ is $\frac{5}{8}$.

Answer: (B)

Q2.

Solution

Express 128 as a power of 2:

$$128 = 2 \times 64 = 2 \times 2^6 = 2^7$$

Since $2^x = 128 = 2^7$, we get $x = 7$.

Answer: (C)

Q3.

Solution

The largest square tile that fits exactly must have a side equal to the HCF of the length and width of the floor.

$$\text{HCF}(6, 4) = 2 \text{ m} = 200 \text{ cm}$$

The side length of the largest square tile is **200 cm**.

Answer: (D)

Q4.

Solution

Let A's present age $= 5x$ years and B's present age $= 7x$ years.

Five years later:

$$\frac{5x + 5}{7x + 5} = \frac{3}{4}$$

Cross-multiplying:

$$4(5x + 5) = 3(7x + 5)$$

$$20x + 20 = 21x + 15$$

$$x = 5$$

A's present age $= 5 \times 5 =$ **25** years.

Answer: (A)

Q5.

Solution

Commission $= 8\%$ of Sales $=$ Rs $2{,}400$

$$\text{Sales} = \frac{2400 \times 100}{8} = \text{Rs } 30{,}000$$

Answer: (B)

Q6.

Solution

The shopkeeper sells 25 pens at the cost price of 30 pens.

Let CP per pen $=$ Re 1. Then:

- CP of 25 pens $=$ Rs 25
- SP of 25 pens $=$ CP of 30 pens $=$ Rs 30

$$\text{Profit} = 30 - 25 = \text{Rs } 5$$

$$\text{Profit\%} = \frac{5}{25} \times 100 = 20\%$$

Answer: (C)

Q7.

Solution

Marked Price $=$ Rs $15{,}000$

Discount $= 20\%$, so SP $= 15{,}000 \times 0.80 =$ Rs $12{,}000$

The shopkeeper incurs a 4% loss, meaning SP is 96% of CP:

$$\text{CP} = \frac{\text{SP}}{0.96} = \frac{12{,}000}{0.96} = \text{Rs } 12{,}500$$

Answer: (D)

Q8.

Solution

Cost Price of 3 items $=$ Rs $1{,}200$

Profit $= 25\%$, so:

$$\text{Total Selling Price} = 1{,}200 \times \left(1 + \frac{25}{100}\right) = 1{,}200 \times 1.25 = \text{Rs } 1{,}500$$

Answer: (A)

Q9.

Solution

SI for n years $= \dfrac{P \times 5 \times n}{100}$

Difference in SI (6 years vs 4 years) $= \dfrac{P \times 5 \times 2}{100} = \dfrac{P}{10}$

$$\frac{P}{10} = 600 \implies P = \text{Rs } 6{,}000$$

Answer: (B)

Q10.

Solution

Population grows at 5% per annum (compound growth):

$$P_2 = P_0 \times \left(1 + \frac{5}{100}\right)^2 = 40{,}000 \times (1.05)^2$$

$(1.05)^2 = 1.1025$

$$P_2 = 40{,}000 \times 1.1025 = 44{,}100$$

Answer: (C)

Q11.

Solution

Sum of 6 numbers $= 6 \times 25 = 150$

Sum of remaining 5 numbers $= 5 \times 24 = 120$

Removed number $= 150 - 120 =$ **30**

Answer: (D)

Q12.

Solution

Work done per day: A $= \frac{1}{30}$, B $= \frac{1}{20}$

Combined rate $= \frac{1}{30} + \frac{1}{20} = \frac{2}{60} + \frac{3}{60} = \frac{5}{60} = \frac{1}{12}$

Work done in 5 days $= 5 \times \frac{1}{12} = \frac{5}{12}$

Work remaining $= 1 - \frac{5}{12} = \frac{7}{12}$

Answer: (A)

Q13.

Solution

Tap alone fills $\frac{1}{8}$ of the tank per hour.

With leak, the net filling rate $= \frac{1}{10}$ per hour.

Leak rate $= \frac{1}{8} - \frac{1}{10} = \frac{5}{40} - \frac{4}{40} = \frac{1}{40}$ per hour.

The leak alone would empty the full tank in **40 hours**.

Answer: (B)

Q14.

Solution

Let distance $= d$ km. The time difference between the two speeds equals the time saved plus time lost:

Walking at 4 km/h takes 20 min more; walking at 6 km/h takes 10 min less. Total difference $= 30$ min $= \frac{1}{2}$ hour.

$$\frac{d}{4} - \frac{d}{6} = \frac{1}{2}$$

$$\frac{3d - 2d}{12} = \frac{1}{2} \implies \frac{d}{12} = \frac{1}{2} \implies d = 6 \text{ km}$$

Answer: (C)

Q15.

Solution

Let the boat's speed in still water $= v$ km/h. Stream speed $= 5$ km/h.

Downstream speed $= v + 5$; Upstream speed $= v - 5$.

Same distance in 2 hours downstream and 3 hours upstream:

$$2(v+5) = 3(v-5)$$

$$2v + 10 = 3v - 15$$

$$v = 25 \text{ km/h}$$

Distance $= 2 \times (25+5) = 2 \times 30 =$ **60** km.

Answer: (D)

Q16.

Solution

Let the tens digit $= a$ and units digit $= b$. The number $= 10a + b$.

Condition 1: Number $= 4\times$ sum of digits:

$$10a + b = 4(a+b) \implies 6a = 3b \implies b = 2a$$

Condition 2: Adding 27 reverses the digits:

$$10a + b + 27 = 10b + a \implies 9a - 9b = -27 \implies b - a = 3$$

Substituting $b = 2a$: $2a - a = 3 \implies a = 3,\ b = 6$.

The number is **36**. Verification: $36 = 4 \times (3+6) = 36$ ✓; $36 + 27 = 63$ (reversed) ✓.

Answer: (A)

Q17.

Solution

Use the algebraic identity:

$$(x+y)^2 - (x-y)^2 = 4xy$$

With $x = 5$ and $y = 3$:

$$4xy = 4 \times 5 \times 3 = 60$$

Answer: (B)

Q18.

Solution

The two angles together form a straight line (supplementary), so their sum is 180°.

Let the angles be $2x$ and $3x$:

$$2x + 3x = 180^\circ \implies 5x = 180^\circ \implies x = 36^\circ$$

The larger angle $= 3x = 3 \times 36^\circ = 108^\circ$.

Answer: (C)

Solution

By the **Midpoint Theorem**: The line segment joining the midpoints of two sides of a triangle is:

Q19.

- Parallel to the third side, and
- Equal to **half** the length of the third side.

Therefore $MN = \frac{1}{2} \times BC$.

Answer: (D)

Q20.

Solution

AD is the median from A to BC, with D the midpoint of BC.

Triangles ABD and ACD share the same height from A to BC. Since $BD = DC$ (D is the midpoint), their bases are equal.

$$\text{Area of } \triangle ABD = \frac{1}{2} \times BD \times h = \frac{1}{2} \times \text{Area of } \triangle ABC$$

$$\therefore \frac{\text{Area of } \triangle ABD}{\text{Area of } \triangle ABC} = \frac{1}{2}, \quad \text{i.e. ratio } = 1 : 2$$

Answer: (A)

Q21.

Solution

Square: Perimeter $= 40$ cm $\Rightarrow$ side $= 10$ cm $\Rightarrow$ Area $= 10^2 = 100$ cm^2

Rectangle: Perimeter $= 40$ cm, length $= 12$ cm:

$$2(12 + w) = 40 \implies 12 + w = 20 \implies w = 8 \text{ cm}$$

Area $= 12 \times 8 = 96$ cm^2

$$\text{Difference} = 100 - 96 = 4 \text{ cm}^2$$

Answer: (B)

Q22.

Solution

Inscribed Angle Theorem: The inscribed angle is half the central angle subtending the same arc.

$$\text{Inscribed angle} = \frac{1}{2} \times \text{Central angle} = \frac{1}{2} \times 100^\circ = 50^\circ$$

Answer: (C)

Q23.

Solution

The path of 5 m runs outside, so the outer boundary forms a larger square.

Outer side $= 40 + 2 \times 5 = 50$ m

$$\text{Area of outer square} = 50^2 = 2500 \text{ m}^2$$

$$\text{Area of inner square (field)} = 40^2 = 1600 \text{ m}^2$$

$$\text{Area of path} = 2500 - 1600 = 900 \text{ m}^2$$

Answer: (D)

Q24.

Solution

Curved Surface Area of a cylinder $= 2\pi rh$

$$\text{CSA} = 2 \times \frac{22}{7} \times 7 \times 20 = 2 \times 22 \times 20 = 880 \text{ cm}^2$$

Answer: (A)

Q25.

Solution

$$\text{Arc length} = \frac{\theta}{360^\circ} \times 2\pi r$$

$$= \frac{60}{360} \times 2 \times \frac{22}{7} \times 21 = \frac{1}{6} \times \frac{22}{7} \times 42 = \frac{1}{6} \times 132 = 22 \text{ cm}$$

Answer: (B)

Q26.

Solution

$$\text{Mean} = \frac{12 + 18 + 24 + 30 + 36}{5} = \frac{120}{5} = 24$$

Answer: (C)

Q27.

Solution

Students scoring 30 or above fall in the intervals 30–40 and 40–50:

$$12 + 6 = \textbf{18} \text{ students}$$

Answer: (D)

Q28.

Solution

The sum of probabilities of all outcomes equals 1:

$$P(\text{no rain}) = 1 - P(\text{rain}) = 1 - 0.35 = 0.65$$

Answer: (A)

Q29.

Solution

$$1^2 + 2^2 + 3^2 + 4^2 + 5^2 = 1 + 4 + 9 + 16 + 25 = 55$$

Answer: (B)

Q30.

Solution

Number of students $= 40$; Fare per student per year $=$ Rs $1{,}500$

$$\text{Total fare} = 40 \times 1{,}500 = \text{Rs } 60{,}000$$

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