YASASVI Mathematics

Sample Paper – 1

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 a rational number?

(A) $\sqrt{16}$

(B) $\sqrt{2}$

(C) π

(D) $\sqrt{5}$

Q2. Evaluate: $\left(2^3 \times 2^4\right) \div 2^5$

(A) 2

(B) 4

(C) 8

(D) 16

Q3. Find the HCF of 48 and 72.

(A) 12

(B) 16

(C) 24

(D) 36

Q4. A and B share Rs 560 in the ratio 3 : 5. How much does B receive?

(A) Rs 210

(B) Rs 240

(C) Rs 280

(D) Rs 350

Q5. A student scored 450 marks out of 600. What percentage did the student score?

(A) 75%

(B) 70%

(C) 80%

(D) 65%

Q6. An article purchased for Rs 240 is sold at a profit of 15%. Find the selling price.

(A) Rs 264

(B) Rs 276

(C) Rs 288

(D) Rs 300

Q7. Successive discounts of 20% and 10% are applied to a marked price of Rs 500. What is the final price?

(A) Rs 340

(B) Rs 350

(C) Rs 360

(D) Rs 375

Q8. The selling price of 15 articles equals the cost price of 18 articles. Find the profit percentage.

(A) 12%

(B) 15%

(C) 18%

(D) 20%

Q9. Find the simple interest on Rs 6,000 at 5% per annum for 3 years.

(A) Rs 900

(B) Rs 800

(C) Rs 1,000

(D) Rs 1,200

Q10. Find the compound interest on Rs 8,000 at 5% per annum compounded annually for 2 years.

(A) Rs 800

(B) Rs 820

(C) Rs 840

(D) Rs 850

Q11. Find the average of the first 15 odd natural numbers.

(A) 12

(B) 14

(C) 15

(D) 16

Q12. A can complete a work in 10 days and B in 15 days. How many days will they take working together?

(A) 8 days

(B) 5 days

(C) 4 days

(D) 6 days

Q13. Pipe A fills a tank in 6 hours and Pipe B fills it in 8 hours. In how many hours will both pipes together fill the tank?

(A) $\frac{24}{7}$ hours

(B) 3 hours

(C) 4 hours

(D) $\frac{7}{2}$ hours

Q14. A car travels at 60 km/h for 2 hours 30 minutes. What distance does it cover?

(A) 120 km

(B) 150 km

(C) 180 km

(D) 140 km

Q15. A train 200 m long passes a stationary pole in 10 seconds. What is the speed of the train in km/h?

(A) 60 km/h

(B) 66 km/h

(C) 72 km/h

(D) 80 km/h

Q16. Solve for x: $3x + 7 = 22$

(A) 3

(B) 4

(C) 6

(D) 5

Q17. Factorise: $x^2 + 5x + 6$

(A) $(x + 2)(x + 3)$

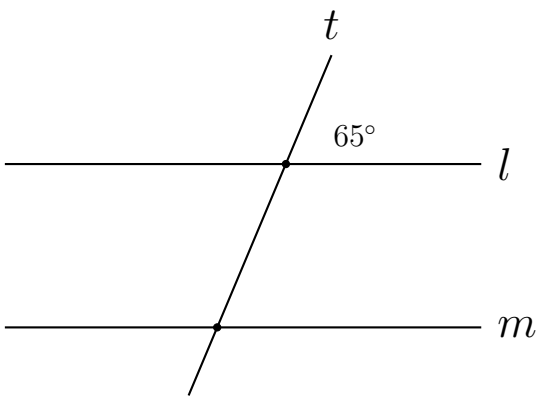
(B) $(x + 1)(x + 6)$

(C) $(x + 2)(x + 4)$

(D) $(x - 2)(x - 3)$

Q18. In the figure, two parallel lines l and m are cut by a transversal t. One of the angles formed at the intersection with l is

$65°$. What is the alternate interior angle at the intersection with m?



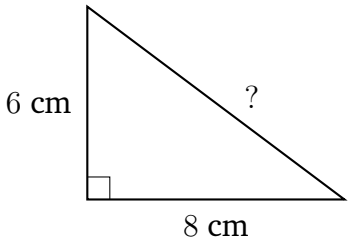
(A) $115°$

(B) $65°$

(C) $125°$

(D) $90°$

Q19. In the figure, a right triangle has legs measuring 6 cm and 8 cm. Find the length of the hypotenuse.



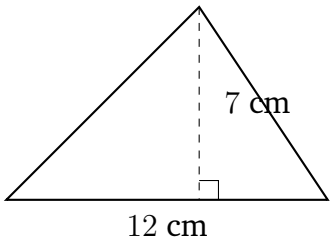
(A) 7 cm

(B) 9 cm

(C) 10 cm

(D) 12 cm

Q20. The figure shows a triangle with base 12 cm and a perpendicular height of 7 cm. Find the area of the triangle.



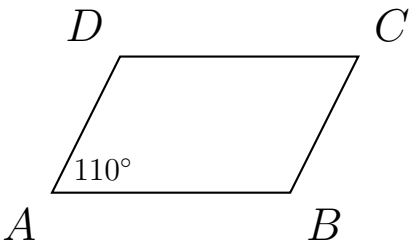
(A) 48 cm^2

(B) 36 cm^2

(C) 28 cm^2

(D) 42 cm^2

Q21. In parallelogram $ABCD$, $\angle A = 110°$. Find $\angle C$.



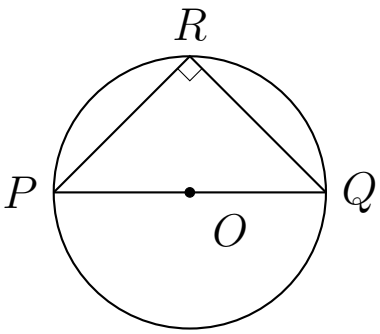
(A) $110°$

(B) $70°$

(C) $90°$

(D) $80°$

Q22. PQ is a diameter of a circle with centre O. R is a point on the circle. Find $\angle PRQ$.



(A) 45°

(B) 90°

(C) 60°

(D) 120°

Q23. Find the perimeter of a rectangle with length 15 cm and breadth 9 cm.

(A) 40 cm

(B) 44 cm

(C) 48 cm

(D) 52 cm

Q24. Find the volume of a cuboid with length 8 cm, breadth 5 cm, and height 3 cm.

(A) 90 cm^3

(B) 100 cm^3

(C) 110 cm^3

(D) 120 cm^3

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

(A) 616 cm^2

(B) 528 cm^2

(C) 704 cm^2

(D) 484 cm^2

Q26. Find the mean of: 8, 10, 12, 14, 16.

(A) 10

(B) 12

(C) 14

(D) 11

Q27. A school has the following students per class: 6A = 40, 6B = 35, 6C = 45, 6D = 30, 6E = 50. What is the total number of students?

(A) 195

(B) 180

(C) 200

(D) 210

Q28. A bag contains 4 red balls and 6 blue balls. If one ball is drawn at random, what is the probability that it is red?

(A) $\frac{1}{3}$

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

(C) $\frac{3}{5}$

(D) $\frac{2}{5}$

Q29. Find the cube root of 729.

(A) 9

(B) 8

(C) 7

(D) 6

Q30. A mixture of 20 litres contains 30% sugar. How many litres of sugar are in the mixture?

(A) 5 litres

(B) 6 litres

(C) 8 litres

(D) 4 litres

Detailed Solutions

Q1.

Solution

A rational number can be expressed as $\frac{p}{q}$ where p, q are integers and $q \neq 0$.

Evaluate each option:

- $\sqrt{16} = 4 = \frac{4}{1}$ — this is an integer, hence rational.
- $\sqrt{2}$ is irrational (non-terminating, non-repeating decimal).
- π is irrational.
- $\sqrt{5}$ is irrational.

Therefore $\sqrt{16}$ is the only rational number among the options.

Answer: (A)

Q2.

Solution

Apply the laws of exponents ($a^m \times a^n = a^{m+n}$ and $a^m \div a^n = a^{m-n}$):

$$\left(2^3 \times 2^4\right) \div 2^5 = 2^{3+4} \div 2^5 = 2^7 \div 2^5 = 2^{7-5} = 2^2 = 4$$

Answer: (B)

Q3.

Solution

Find HCF of 48 and 72 using prime factorisation:

$$48 = 2^4 \times 3^1$$
$$72 = 2^3 \times 3^2$$

HCF = product of the lowest powers of common prime factors:

$$\text{HCF} = 2^3 \times 3^1 = 8 \times 3 = 24$$

Answer: (C)

Q4.

Solution

Total parts $= 3 + 5 = 8$ parts.

Value of 1 part $= \frac{560}{8} = \text{Rs } 70$.

B's share (5 parts) $= 5 \times 70 = \text{Rs } 350$.

Answer: (D)

Q5.

Solution

$$\text{Percentage} = \frac{\text{Marks obtained}}{\text{Total marks}} \times 100 = \frac{450}{600} \times 100 = \frac{3}{4} \times 100 = 75\%$$

Answer: (A)

Q6.

Solution

Given: Cost Price $=$ Rs 240, Profit $= 15\%$

$$\text{SP} = \text{CP} \times \left(1 + \frac{\text{Profit\%}}{100}\right) = 240 \times \frac{115}{100} = 240 \times 1.15$$

$$= 24 \times 11.5 = \text{Rs } 276$$

Answer: (B)

Q7.

Solution

Marked Price $=$ Rs 500.

After the 1st discount of 20%:

$$\text{Price}_1 = 500 \times \frac{80}{100} = \text{Rs } 400$$

After the 2nd discount of 10%:

$$\text{Final price} = 400 \times \frac{90}{100} = \text{Rs } 360$$

Answer: (C)

Q8.

Solution

Let CP per article $=$ Re 1, so CP of 18 articles $=$ Rs 18.

Given: SP of 15 articles $=$ CP of 18 articles $=$ Rs 18.

SP per article $= \frac{18}{15} = \text{Rs } 1.20$

Profit per article $= 1.20 - 1.00 = \text{Rs } 0.20$

$$\text{Profit\%} = \frac{0.20}{1.00} \times 100 = 20\%$$

Answer: (D)

Q9.

Solution

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

$$\text{SI} = \frac{6000 \times 5 \times 3}{100} = \frac{90000}{100} = \text{Rs } 900$$

Answer: (A)

Q10.

Solution

Formula: $A = P\left(1 + \dfrac{R}{100}\right)^T$

$$A = 8000 \times \left(1 + \frac{5}{100}\right)^2 = 8000 \times (1.05)^2$$

$(1.05)^2 = 1.1025$

$$A = 8000 \times 1.1025 = \text{Rs } 8820$$

Compound Interest $= A - P = 8820 - 8000 = \text{Rs } 820$

Answer: (B)

Q11.

Solution

The first 15 odd natural numbers are: $1, 3, 5, \ldots, 29$.

Using the formula: Sum of first n odd natural numbers $= n^2$:

$$\text{Sum} = 15^2 = 225$$

$$\text{Average} = \frac{225}{15} = 15$$

Answer: (C)

Q12.

Solution

A's work rate $= \dfrac{1}{10}$ work per day; B's work rate $= \dfrac{1}{15}$ work per day.

Combined rate $= \dfrac{1}{10} + \dfrac{1}{15} = \dfrac{3}{30} + \dfrac{2}{30} = \dfrac{5}{30} = \dfrac{1}{6}$ work per day.

Time to complete the work $= \frac{1}{\frac{1}{6}} = 6$ days.

Answer: (D)

Q13.

Solution

Pipe A fills $\frac{1}{6}$ of the tank per hour; Pipe B fills $\frac{1}{8}$ of the tank per hour.

Combined filling rate $= \frac{1}{6} + \frac{1}{8} = \frac{4}{24} + \frac{3}{24} = \frac{7}{24}$ per hour.

Time to fill the tank $= \frac{1}{\frac{7}{24}} = \frac{24}{7}$ hours.

Answer: (A)

Q14.

Solution

Time $= 2$ hours 30 minutes $= 2.5$ hours.

Distance $=$ Speed $\times$ Time $= 60 \times 2.5 = 150$ km.

Answer: (B)

Q15.

Solution

To pass a stationary pole, the train must travel a distance equal to its own length (200 m).

Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{200}{10} = 20$ m/s.

Convert to km/h:

$$20 \text{ m/s} \times \frac{18}{5} = 72 \text{ km/h}$$

Answer: (C)

Q16.

Solution

Solve $3x + 7 = 22$:

$$3x = 22 - 7 = 15$$

$$x = \frac{15}{3} = 5$$

Verification: $3(5) + 7 = 15 + 7 = 22$. ✓

Answer: (D)

Q17.

Solution

We need two numbers whose product is $+6$ and sum is $+5$: these are 2 and 3.

$$x^2 + 5x + 6 = x^2 + 2x + 3x + 6 = x(x+2) + 3(x+2) = (x+2)(x+3)$$

Verification: $(x+2)(x+3) = x^2 + 3x + 2x + 6 = x^2 + 5x + 6$. ✓

Answer: (A)

Q18.

Solution

When a transversal intersects two parallel lines, alternate interior angles are equal (Alternate Interior Angles Theorem).

The given angle at the intersection with line l is $65°$.

The alternate interior angle at the intersection with line m is also $\mathbf{65°}$.

Answer: (B)

Q19.

Solution

By the Pythagorean theorem, for a right triangle with legs a and b and hypotenuse c:

$$c^2 = a^2 + b^2 = 6^2 + 8^2 = 36 + 64 = 100$$

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

Answer: (C)

Q20.

Solution

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 12 \times 7 = 6 \times 7 = 42 \text{ cm}^2$$

Answer: (D)

Q21.

Solution

In a parallelogram, opposite angles are equal.

$\angle A$ and $\angle C$ are opposite angles in parallelogram $ABCD$.

Therefore $\angle C = \angle A = 110°$.

(Also note: co-interior angles $\angle A + \angle B = 180^\circ \Rightarrow \angle B = 70^\circ$, and $\angle D = 70^\circ$.)

Answer: (A)

Q22.

Solution

By the **Angle in a Semicircle** theorem: the angle subtended by a diameter at any point on the circle is always 90°.

Since PQ is a diameter and R is a point on the circle:

$$\angle PRQ = 90^\circ$$

Answer: (B)

Q23.

Solution

$$\text{Perimeter of rectangle} = 2(\ell + b) = 2(15 + 9) = 2 \times 24 = 48 \text{ cm}$$

Answer: (C)

Q24.

Solution

$$\text{Volume of cuboid} = \ell \times b \times h = 8 \times 5 \times 3 = 120 \text{ cm}^3$$

Answer: (D)

Q25.

Solution

$$\text{Area of circle} = \pi r^2 = \frac{22}{7} \times (14)^2 = \frac{22}{7} \times 196 = 22 \times 28 = 616 \text{ cm}^2$$

Answer: (A)

Q26.

Solution

$$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Number of observations}} = \frac{8 + 10 + 12 + 14 + 16}{5} = \frac{60}{5} = 12$$

Answer: (B)

Q27.

Solution

Total students $= 40 + 35 + 45 + 30 + 50$.

$= 75 + 45 + 30 + 50 = 75 + 125 = 200$

Answer: (C)

Q28.

Solution

Total number of balls $= 4 + 6 = 10$.

Favourable outcomes (drawing a red ball) $= 4$.

$$P(\text{red ball}) = \frac{\text{Favourable outcomes}}{\text{Total outcomes}} = \frac{4}{10} = \frac{2}{5}$$

Answer: (D)

Q29.

Solution

We need $\sqrt[3]{729}$.

Test $9^3 = 9 \times 9 \times 9 = 81 \times 9 = 729$. ✓

Therefore $\sqrt[3]{729} = 9$.

Answer: (A)

Q30.

Solution

Quantity of sugar $= 30\%$ of 20 litres.

$$\text{Sugar} = \frac{30}{100} \times 20 = \frac{600}{100} = 6 \text{ litres}$$

Answer: (B)

Answer Key

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