YASASVI Mathematics

Sample Paper – 8

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 property of multiplication is shown by $7 \times (3 + 5) = 7 \times 3 + 7 \times 5$?

(A) Distributive property

(B) Commutative property

(C) Associative property

(D) Closure property

Q2. Express 0.00045 in standard form.

(A) 45×10^{-5}

(B) 4.5×10^{-4}

(C) 0.45×10^{-3}

(D) 4.5×10^{-3}

Q3. Two ropes of lengths 60 m and 90 m are cut into pieces of equal length with no remainder. What is the greatest possible length of each piece?

(A) 10 m

(B) 20 m

(C) 30 m

(D) 15 m

Q4. If 6 workers take 12 days to finish a task, how many days will 9 workers take?

(A) 6 days

(B) 10 days

(C) 7 days

(D) 8 days

Q5. After a 25% increase, a price becomes Rs 250. What was the original price?

(A) Rs 200

(B) Rs 225

(C) Rs 180

(D) Rs 190

Q6. A fruit seller buys 100 mangoes at Rs 4 each. He sells 80 at Rs 6 each; the remaining 20 are wasted. Find the overall

profit percentage.

(A) 15% profit

(B) 20% profit

(C) 25% profit

(D) 10% profit

Q7. A shopkeeper uses an 800 g weight instead of 1 kg and sells goods at cost price. Find the profit percentage.

(A) 20%

(B) 22%

(C) 25%

(D) 30%

Q8. A person buys 6 bananas for Rs 1 and sells 4 bananas for Rs 1. What is the profit percentage?

(A) 25%

(B) 33.33%

(C) 40%

(D) 50%

Q9. At 8% per annum simple interest, how many years will it take for Rs 5,000 to double itself?

(A) 12.5 years

(B) 10 years

(C) 15 years

(D) 8 years

Q10. The compound interest on Rs 1,000 for 2 years is Rs 210. Find the rate of interest per annum.

(A) 8%

(B) 10%

(C) 12%

(D) 15%

Q11. Find the mean of: 65, 72, 80, 55, 68.

(A) 65

(B) 70

(C) 68

(D) 72

Q12. Pipe X fills a cistern in 16 hours and Pipe Y fills it in 24 hours. Together, how many hours will they take?

(A) 8 hours

(B) 10 hours

(C) 8.5 hours

(D) 9.6 hours

Q13. 8 men can complete a work in 15 days. How many days will 20 men take?

(A) 6 days

(B) 5 days

(C) 4 days

(D) 8 days

Q14. A cyclist covers 100 km in 4 hours. What is the average speed?

(A) 20 km/h

(B) 25 km/h

(C) 30 km/h

(D) 15 km/h

Q15. Runners A and B start a 200 m race together. A runs at 5 m/s and B at 4 m/s. When A finishes, how far behind is B?

(A) 30 m

(B) 35 m

(C) 40 m

(D) 45 m

Q16. The sum of present ages of a father and son is 50 years. Ten years ago, the father's age was 4 times the son's age. Find the son's present age.

(A) 12

(B) 14

(C) 18

(D) 16

Q17. If $x = 3$ and $y = -2$, find the value of $3x^2 - 2y + 5$.

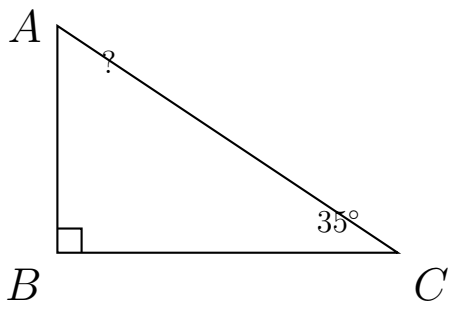
(A) 36

(B) 28

(C) 32

(D) 40

Q18. In a triangle, one angle is 90° and another is 35°. Find the third angle.



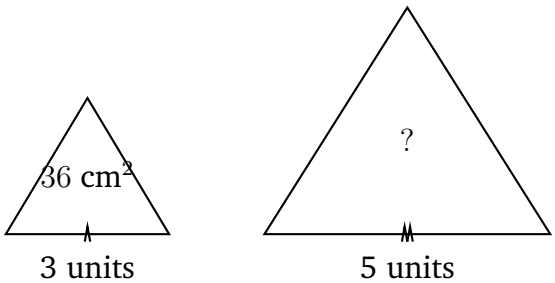
(A) 45°

(B) 55°

(C) 65°

(D) 70°

Q19. Two similar triangles have corresponding sides in the ratio $3 : 5$. If the area of the smaller triangle is 36 cm^2, find the area of the larger triangle.



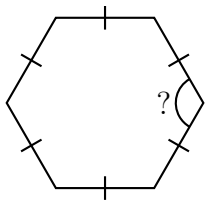
(A) $60\ \text{cm}^2$

(B) $80\ \text{cm}^2$

(C) $100\ \text{cm}^2$

(D) $120\ \text{cm}^2$

Q20. Find the interior angle of a regular hexagon.



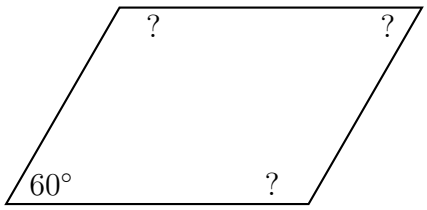
(A) $90°$

(B) $108°$

(C) $110°$

(D) $120°$

Q21. In a parallelogram, one angle is $60°$. Find the sum of the other three angles.



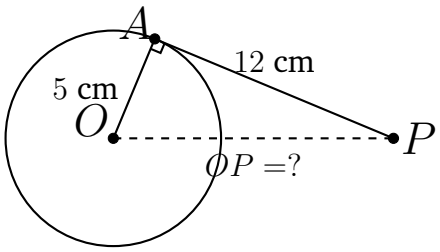
(A) $300°$

(B) $270°$

(C) $280°$

(D) $320°$

Q22. From an external point P, tangents PA and PB are drawn to a circle of radius 5 cm. If $PA = 12$ cm, find OP (where O is the centre).



(A) 10 cm

(B) 13 cm

(C) 15 cm

(D) 12 cm

Q23. A rectangular garden is 20 m $\times$ 15 m. A path 2 m wide runs inside all around the perimeter. Find the area of the path.

(A) 100 m^2

(B) 112 m^2

(C) 124 m^2

(D) 136 m^2

Q24. A cube has a total surface area of 96 cm^2. Find its volume.

(A) 48 cm^3

(B) 56 cm^3

(C) 60 cm^3

(D) 64 cm^3

Q25. Find the perimeter of a semicircle with radius 7 cm. $\left(\text{Use } \pi = \frac{22}{7}\right)$

(A) 36 cm

(B) 30 cm

(C) 28 cm

(D) 44 cm

Q26. Find the mean of the following data: marks 10, 20, 30, 40 with frequencies 2, 3, 4, 1 respectively.

(A) 22

(B) 24

(C) 26

(D) 28

Q27. In a comparison, A's scores in English and Maths are 85 and 65 respectively, while B scored 70 in both subjects. By how many total marks does A exceed B?

(A) 5

(B) 8

(C) 10

(D) 15

Q28. A card is drawn at random from a standard deck of 52 cards. What is the probability that it is a king?

(A) $\frac{1}{4}$

(B) $\frac{1}{26}$

(C) $\frac{4}{13}$

(D) $\frac{1}{13}$

Q29. What is the sum of the first 12 natural numbers?

(A) 78

(B) 66

(C) 91

(D) 105

Q30. A worker's salary was first increased by 10% and then decreased by 10%. What is the net percentage change in the salary?

(A) No change

(B) 1% decrease

(C) 2% decrease

(D) 1% increase

Detailed Solutions

Q1.

Solution

The distributive property of multiplication states that multiplying a number by a sum gives the same result as multiplying the number by each addend and then adding the products:

$$a \times (b + c) = a \times b + a \times c$$

Here, $7 \times (3 + 5) = 7 \times 3 + 7 \times 5 = 21 + 35 = 56$.

This is the **Distributive property** of multiplication over addition.

Answer: (A)

Q2.

Solution

Standard form requires writing the number as $a \times 10^n$ where $1 \leq a < 10$.

Move the decimal point 4 places to the right:

$$0.00045 = 4.5 \times 10^{-4}$$

The power of 10 is -4 because the decimal was moved 4 places to the right.

Answer: (B)

Q3.

Solution

The greatest length that divides both 60 m and 90 m exactly (with no remainder) is the **HCF** (Highest Common Factor).

Using prime factorisation:

$$60 = 2^2 \times 3 \times 5$$
$$90 = 2 \times 3^2 \times 5$$

$$\text{HCF}(60,\ 90) = 2 \times 3 \times 5 = 30 \text{ m}$$

Answer: (C)

Q4.

Solution

Workers and days are inversely proportional: more workers means fewer days needed.

Using $M_1 \times D_1 = M_2 \times D_2$:

$$6 \times 12 = 9 \times D$$

$$D = \frac{6 \times 12}{9} = \frac{72}{9} = 8 \text{ days}$$

Answer: (D)

Q5.

Solution

Let the original price be Rs x.

A 25% increase makes the new price equal to 125% of the original:

$$x \times \frac{125}{100} = 250$$

$$x = \frac{250 \times 100}{125} = \frac{25000}{125} = \text{Rs } 200$$

Answer: (A)

Q6.

Solution

Cost Price (CP) $= 100 \times 4 =$ Rs 400

Selling Price (SP) $= 80 \times 6 =$ Rs 480 (20 mangoes wasted, not sold)

$$\text{Profit} = \text{SP} - \text{CP} = 480 - 400 = \text{Rs } 80$$

$$\text{Profit\%} = \frac{80}{400} \times 100 = 20\%$$

Answer: (B)

Q7.

Solution

The shopkeeper gives only 800 g but charges the customer for 1000 g (1 kg).

Let the cost price of 1000 g goods be Rs 100. The shopkeeper actually spends only on 800 g:

$$\text{Profit\%} = \frac{1000 - 800}{800} \times 100 = \frac{200}{800} \times 100 = 25\%$$

Answer: (C)

Q8.

Solution

CP of one banana $= \frac{1}{6}$ (buys 6 for Re 1)

SP of one banana $= \frac{1}{4}$ (sells 4 for Re 1)

$$\text{Profit per banana} = \frac{1}{4} - \frac{1}{6} = \frac{3-2}{12} = \frac{1}{12}$$

$$\text{Profit\%} = \frac{1/12}{1/6} \times 100 = \frac{6}{12} \times 100 = \frac{1}{2} \times 100 = 50\%$$

Answer: (D)

Q9.

Solution

For the amount to double, the Simple Interest must equal the original principal (SI $= P$).

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

$$P = \frac{P \times 8 \times T}{100}$$

$$T = \frac{100}{8} = 12.5 \text{ years}$$

Answer: (A)

Q10.

Solution

Amount $A =$ Rs $1000 +$ Rs $210 =$ Rs 1210

Using $A = P\left(1 + \frac{R}{100}\right)^2$:

$$1210 = 1000 \times \left(1 + \frac{R}{100}\right)^2$$

$$\left(1 + \frac{R}{100}\right)^2 = \frac{1210}{1000} = 1.21$$

$$1 + \frac{R}{100} = \sqrt{1.21} = 1.1$$

$$\frac{R}{100} = 0.1 \implies R = 10\%$$

Answer: (B)

Q11.

Solution

$$\text{Mean} = \frac{65 + 72 + 80 + 55 + 68}{5} = \frac{340}{5} = 68$$

Answer: (C)

Q12.

Solution

Work done by Pipe X per hour $= \frac{1}{16}$

Work done by Pipe Y per hour $= \frac{1}{24}$

Combined work rate $= \frac{1}{16} + \frac{1}{24} = \frac{3}{48} + \frac{2}{48} = \frac{5}{48}$

Time to fill cistern together $= \frac{48}{5} = 9.6$ hours.

Answer: (D)

Q13.

Solution

Men and days are inversely proportional: more men means fewer days.

Using $M_1 \times D_1 = M_2 \times D_2$:

$$8 \times 15 = 20 \times D_2$$

$$D_2 = \frac{8 \times 15}{20} = \frac{120}{20} = 6 \text{ days}$$

Answer: (A)

Q14.

Solution

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{100 \text{ km}}{4 \text{ h}} = 25 \text{ km/h}$$

Answer: (B)

Q15.

Solution

A finishes the 200 m race at speed 5 m/s:

$$\text{Time taken by A} = \frac{200}{5} = 40 \text{ s}$$

Distance covered by B in 40 s at 4 m/s:

$$\text{Distance by B} = 4 \times 40 = 160 \text{ m}$$

Distance B is behind when A finishes:

$$200 - 160 = 40 \text{ m}$$

Answer: (C)

Q16.

Solution

Let the son's present age $= s$ years. Then father's present age $= 50 - s$ years.

Ten years ago: son's age $= s - 10$, father's age $= 40 - s$.

Given that the father's age was 4 times the son's age ten years ago:

$$40 - s = 4(s - 10)$$

$$40 - s = 4s - 40$$

$$80 = 5s$$

$$s = 16 \text{ years}$$

Answer: (D)

Q17.

Solution

Substituting $x = 3$ and $y = -2$:

$$3x^2 - 2y + 5 = 3(3)^2 - 2(-2) + 5 = 3 \times 9 + 4 + 5 = 27 + 4 + 5 = 36$$

Answer: (A)

Q18.

Solution

By the angle sum property of a triangle, all three interior angles sum to $180°$:

$$\angle A + \angle B + \angle C = 180°$$

$$? + 90° + 35° = 180°$$

$$? = 180° - 90° - 35° = 55°$$

Answer: (B)

Q19.

Solution

The ratio of the areas of two similar triangles equals the *square* of the ratio of their corresponding sides.

Ratio of corresponding sides $= 3 : 5$

$$\frac{\text{Area of smaller triangle}}{\text{Area of larger triangle}} = \left(\frac{3}{5}\right)^2 = \frac{9}{25}$$

$$\text{Area of larger triangle} = 36 \times \frac{25}{9} = 4 \times 25 = 100 \text{ cm}^2$$

Answer: (C)

Q20.

Solution

For a regular polygon with n sides, the interior angle is:

$$\text{Interior angle} = \frac{(n-2) \times 180^\circ}{n}$$

For a regular hexagon ($n = 6$):

$$\text{Interior angle} = \frac{(6-2) \times 180^\circ}{6} = \frac{4 \times 180^\circ}{6} = \frac{720^\circ}{6} = 120^\circ$$

Answer: (D)

Solution

In a parallelogram, opposite angles are equal and consecutive angles are supplementary (sum to 180°).

If one angle is 60°:

Q21.

- The opposite angle $= 60^\circ$
- Each of the two adjacent angles $= 180^\circ - 60^\circ = 120^\circ$

The other three angles are 120°, 60°, and 120°.

$$\text{Sum} = 120^\circ + 60^\circ + 120^\circ = 300^\circ$$

Answer: (A)

Q22.

Solution

A tangent is perpendicular to the radius at the point of tangency, so $\angle OAP = 90°$.

In right triangle OAP, applying the Pythagorean theorem:

$$OP^2 = OA^2 + PA^2 = 5^2 + 12^2 = 25 + 144 = 169$$

$$OP = \sqrt{169} = 13 \text{ cm}$$

Answer: (B)

Q23.

Solution

Outer area of garden $= 20 \times 15 = 300$ m^2

The path 2 m wide runs inside all around, reducing each dimension by $2 \times 2 = 4$ m:

Inner dimensions $= (20 - 4) \times (15 - 4) = 16 \times 11 = 176$ m^2

Area of path $= 300 - 176 = 124$ m^2

Answer: (C)

Q24.

Solution

Let the edge length of the cube be a.

Total Surface Area $= 6a^2 = 96$ cm^2

$$a^2 = \frac{96}{6} = 16 \implies a = 4 \text{ cm}$$

Volume $= a^3 = 4^3 = 64$ cm^3

Answer: (D)

Q25.

Solution

Perimeter of a semicircle $=$ curved arc $+$ diameter $= \pi r + 2r$

With $r = 7$ cm and $\pi = \frac{22}{7}$:

$$\text{Perimeter} = \frac{22}{7} \times 7 + 2 \times 7 = 22 + 14 = 36 \text{ cm}$$

Answer: (A)

Q26.

Solution

$$\text{Mean} = \frac{\sum f_i\, x_i}{\sum f_i}$$

$$\sum f_i\, x_i = (10 \times 2) + (20 \times 3) + (30 \times 4) + (40 \times 1) = 20 + 60 + 120 + 40 = 240$$

$$\sum f_i = 2 + 3 + 4 + 1 = 10$$

$$\text{Mean} = \frac{240}{10} = 24$$

Answer: (B)

Q27.

Solution

Total marks scored by A $= 85 + 65 = 150$

Total marks scored by B $= 70 + 70 = 140$

A exceeds B by $= 150 - 140 =$ **10** marks.

Answer: (C)

Q28.

Solution

Total cards in a standard deck $= 52$

Number of kings $= 4$ (one per suit: hearts, diamonds, clubs, spades)

$$P(\text{drawing a king}) = \frac{4}{52} = \frac{1}{13}$$

Answer: (D)

Q29.

Solution

The sum of the first n natural numbers is:

$$S_n = \frac{n(n+1)}{2}$$

For $n = 12$:

$$S_{12} = \frac{12 \times 13}{2} = \frac{156}{2} = 78$$

Answer: (A)

Q30.

Solution

Let the original salary be Rs 100.

After a 10% increase: $100 \times 1.10 = \text{Rs } 110$

After a 10% decrease on the new salary: $110 \times 0.90 = \text{Rs } 99$

Net change $= 99 - 100 = -\text{Re } 1$

$$\text{Net percentage change} = \frac{-1}{100} \times 100 = -1\% \quad \text{(a \textbf{1\% decrease})}$$

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