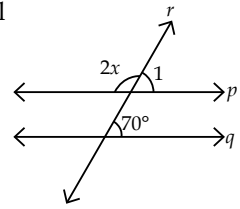
Post-Mid Term

SOLUTIONS

1. **(a) :** $\because$ $p \parallel q$ and r is transversal

$\therefore$ $\angle 1 = 70°$

(Corresponding angles)



Also, $\angle 1 + 2x = 180°$

(Linear pair)

$\Rightarrow$ $2x = 180° - \angle 1$

$= 180° - 70° = 110°$

$\Rightarrow$ $x = 55°$

2. **(d) :** Given, abscissa of the point $= \frac{1}{2} = 0.5$

Ordinate of the point $= \frac{-3}{4} = -0.75$

$\therefore$ The coordinates of the point are $(0.5, -0.75)$

3. **(d) :** No circle can be drawn through 3 collinear points.

4. The decimal representation of an irrational number is neither terminating nor repeating.

5. Here, side of an equilateral triangle = '$2a$' units.

Now, area of equilateral triangle with side '$2a$' $= \frac{\sqrt{3}}{4}(\text{side})^2$

$= \frac{\sqrt{3}}{4}(2a)^2$ sq. units $= \sqrt{3}\,a^2$

6. Given, a triangle and a rhombus are on the same base and between the same parallels.

$\therefore$ Area of triangle $= \frac{1}{2} \times$ area of rhombus

[$\because$ A rhombus is a parallelogram]

$\Rightarrow$ Area of rhombus $= 2 \times$ area of triangle

$= 2 \times 29 = 58$ cm^2

7. Total number of balls, Ankit bowled = 30

Number of wickets taken by Ankit = 5

$\therefore$ Probability of batsman getting out by Ankit's bowling $= \frac{5}{30} = \frac{1}{6}$

Now, the probability of batsman not getting out by Ankit's bowling = 1 – P(batsman getting out by Ankit's bowling) $= 1 - \frac{1}{6} = \frac{5}{6}$

8. Given, $x^2 - 3x - 1 = 0$

$\Rightarrow$ $x^2 - 3x = 1$

$\Rightarrow$ $x(x - 3) = 1$

$\Rightarrow$ $x - 3 = 1/x$

$\Rightarrow$ $x - 1/x = 3$ ...(i)

Now, $\left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2$

$\Rightarrow$ $3^2 = x^2 + \frac{1}{x^2} - 2$ [Using (i)]

$\Rightarrow$ $9 + 2 = x^2 + \frac{1}{x^2}$ $\Rightarrow$ $x^2 + \frac{1}{x^2} = 11$

9. Given, $\angle B = \left(\frac{3}{4}\right)^{\text{th}}$ of $\angle A$

$= \frac{3}{4} \times (4x + 24°) = 3x + 18°$

Also, $\angle C = 180° - (\angle A + \angle B)$

(By angle sum property of a triangle)

$= 180° - (4x + 24° + 3x + 18°)$

$= 180° - 7x - 42° = 138° - 7x$

In ΔABC, $AB = AC$ $\Rightarrow$ $\angle C = \angle B$

[$\because$ Angles opposite to equal sides are equal.]

$\Rightarrow$ $138° - 7x = 3x + 18°$

$\Rightarrow$ $138° - 18° = 3x + 7x$ $\Rightarrow$ $120° = 10x$ $\Rightarrow$ $x = 12°$

Thus, $\angle A = 4x + 24° = 4 \times 12° + 24° = 72°$

10. Let $\angle R = 3x$ and $\angle S = 2x$

Now, $\angle P + \angle Q + \angle R + \angle S = 360°$

(By angle sum property of a quadrilateral)

$\Rightarrow$ $250° + 3x + 2x = 360° \Rightarrow 5x = 110° \Rightarrow x = 22°$

$\therefore$ $\angle R = 3x = 3 \times 22° = 66°$

$\angle S = 2x = 2 \times 22° = 44°$

Now, $\angle R - \angle S = 66° - 44° = 22°$

11. Total number of patients = 200

(i) Number of patients cured in less than 2 months $= 100 + 35 = 135$

$\therefore$ P(a patient will be cured in less than 2 months)

$= \frac{135}{200} = \frac{27}{40}$

(ii) Number of patients cured in 1 month or more but not more than 3 months $= 35 + 35 = 70$

$\therefore$ Required probability $= \frac{70}{200} = \frac{7}{20}$

12. External dimensions of box = 18 cm, 15 cm and 10.8 cm

Total volume of box with wood $= 18 \times 15 \times 10.5 = 2835$ cm^3

Thickness of wood = 5 mm = 0.5 cm

Internal length $= 18 - (2 \times 0.5) = 17$ cm

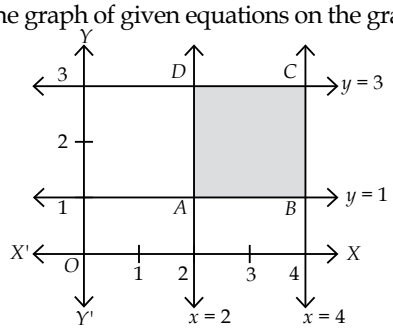
Internal breadth $= 15 - (2 \times 0.5) = 14$ cm

Internal height $= 10.5 - 0.5 = 10$ cm

Internal volume of box $= 17 \times 14 \times 10 = 2380$ cm^3

$\therefore$ Volume of required wood $= 2835 - 2380 = 455$ cm^3

13. The given equations are $x = 4$, $x = 2$, $y = 1$ and $y = 3$
We know that equation of form $x = a$ is a line through $(a, 0)$ and parallel to y-axis and that of form $y = a$ is a line through $(0, a)$ and parallel to x-axis in Cartesian plane.
Drawing the graph of given equations on the graph, we get



Distance between lines $x = 2$ and $x = 4$ is 2 units and that of between $y = 1$ and $y = 3$ is also 2 units.
So, the figure formed by these lines is a square.
$\therefore$ Area of square $ABCD = (\text{side})^2 = 2^2 = 4$ sq. units.

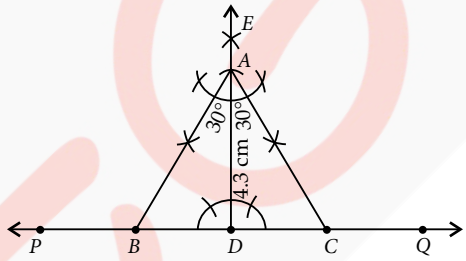
14. (i) Range = Highest value – Lowest value
= 10 – 0 = 10
(ii) Frequency distribution table :

Score	Tally marks	frequency
0					3
1				2
2						4
3				2
4						6
5						4
6						7
7						5
8						4
9				2
10			1
		Total = 40

(iii) Number of students who got Grade E
= 3 + 2 + 4 + 2 = 11
(iv) Number of students who got Grade A = 2 + 1 = 3
$\therefore$ Percentage of students got grade A = $\frac{3}{40} \times 100\% = 7.5\%$

15. Steps of construction :

Step I : Draw a line $\overleftrightarrow{PQ}$.
Step II : Take a point D on PQ and draw $DE \perp PQ$.
Step III : Cut the line segment AD of length 4.3 cm from DE.
Step IV : Draw equal angles of 30° at A on both sides of AD such that $\angle CAD = 30°$ and $\angle BAD = 30°$, where B and C lie on PQ.



Thus, ΔABC is the required triangle.
Justification :
We have, $\angle A = \angle BAD + \angle CAD = 30° + 30° = 60°$
Also, $AD \perp BC$
$\therefore$ $\angle ADB = 90°$
In ΔABD, $\angle BAD + \angle DBA + \angle ADB = 180°$
[By angle sum property of a triangle]
$\Rightarrow$ $30° + 90° + \angle DBA = 180°$
$\Rightarrow$ $\angle DBA = 60°$
Similarly, $\angle DCA = 60°$
$\therefore$ $\angle A = \angle B = \angle C = 60°$
Thus, ΔABC is an equilateral triangle. Hence, our construction is justified.

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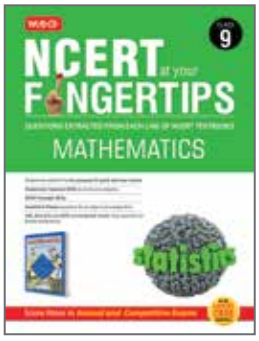

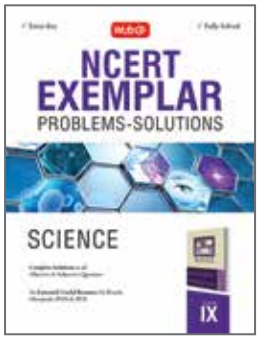

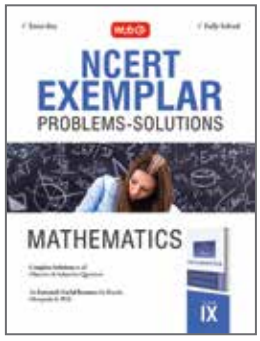

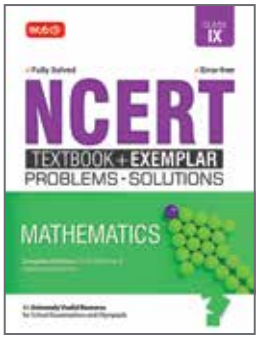

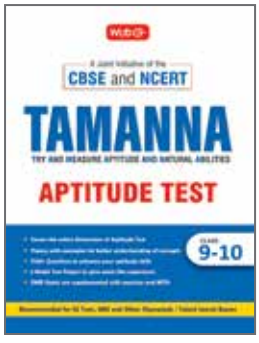

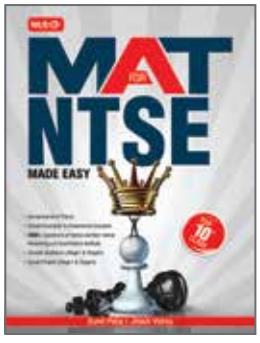

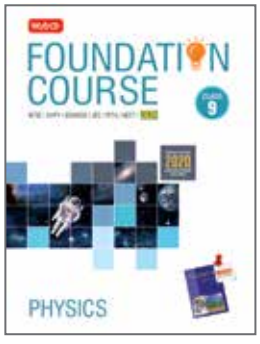

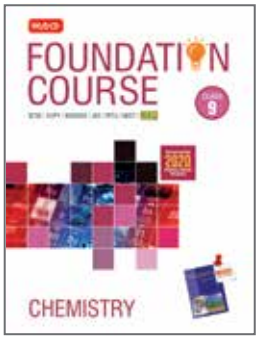

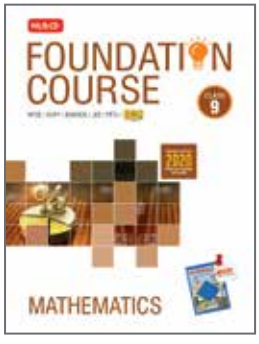

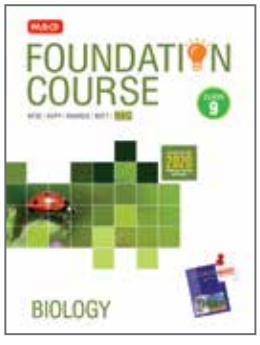

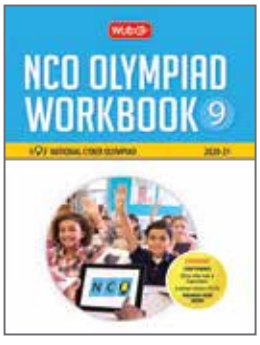

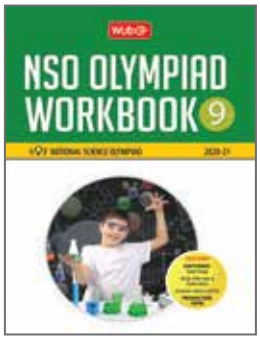

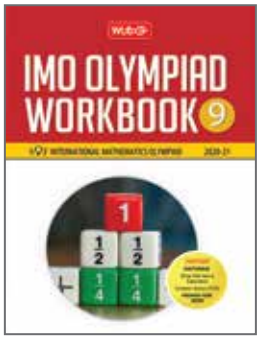

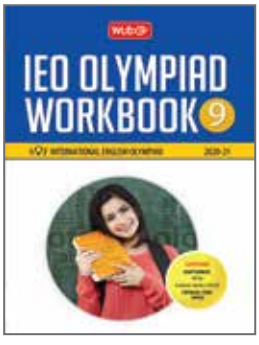

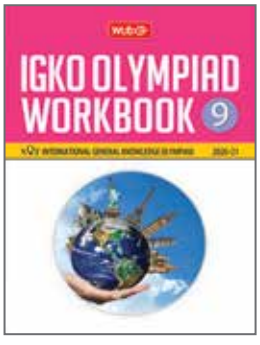

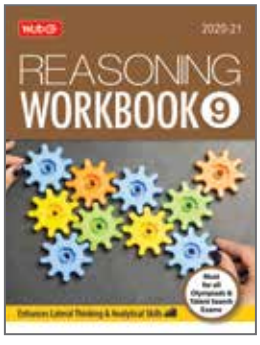

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