

Some Fun Cross Topic Questions – Solutions

1. $4(3x - 9) = 3(x + 15)$
 $\therefore 12x - 36 = 3x + 45$
 $\therefore 9x = 81$
 $\therefore x = 9$
 $\therefore \text{side of square} = 3(9) - 9 = 18$
 $\therefore \text{Area} = 18^2 = 324 \text{ units}^2$
2. Shaded area $= [10 \times 2] + [10 \times 6 - 6 \times 2]$
 $= 20 + 60 - 12$
 $= 68$
 Area of big rectangle $= 30 \times 20$
 $= 600$
 $\therefore \text{Probability} = \frac{68}{600}$
 $= 11,3\%$



3. $2^x + 20 = 3 \times 2^x - 12 \quad \dots \angle^s \text{ opp equal sides}$
 $\therefore -2 \times 2^x = -32$
 $\therefore 2^x = 16$
 $\therefore x = 4$
 $\therefore \hat{E} = 2^4 + 20 = 36^\circ = \hat{F}$
 $\therefore \hat{D} = 108^\circ \quad \dots \angle \text{ sum of } \Delta$



4. In ΔPQR and ΔTSV
 1. $PQ = TS \quad \dots \text{given}$
 2. $QR = SV \quad \dots \text{given}$
 3. $PR = TV \quad \dots \text{given}$ $\therefore \Delta PQR \equiv \Delta TSV \quad \dots \text{SSS}$
 $\therefore \hat{Q} = \hat{S} \quad \dots \Delta PQR \equiv \Delta TSV$
 $\therefore 3x + 10 = 4x - 7$
 $\therefore x = 17$
 $\therefore \hat{Q} = 3(17) + 10 = 61^\circ$
 and $\hat{R} = 2(17) = 34^\circ$
 $\therefore \hat{P} = 85^\circ \quad \dots \angle \text{ sum of } \Delta$
 $\therefore \hat{T} = 85^\circ \quad \dots \Delta PQR \equiv \Delta TSV$

$$\begin{aligned}
 5. \quad 5.1 \quad & \frac{x^2-9}{x^2+8x+15} \times \frac{6x^2+24x-30}{2x-6} \\
 &= \frac{(x-3)(x+3)}{(x+3)(x+5)} \times \frac{6(x^2+4x-5)}{2(x-3)} \\
 &= \frac{\cancel{(x-3)} \cancel{(x+3)}}{\cancel{(x+3)} (x+5)} \times \frac{\overset{3}{\cancel{6}} \cancel{(x+5)} (x-1)}{\cancel{2} \cancel{(x-3)}} \\
 &= 3(x-1)
 \end{aligned}$$

5.2 Undefined when division by 0.

$\therefore$ undefined when:

$$x+3 = 0$$

$$\therefore x = -3$$

$$x+5 = 0$$

$$\therefore x = -5$$

$$x-3 = 0$$

$$\therefore x = 3$$

$$5.3 \quad y = \frac{x^2-9}{x^2+8x+15} \times \frac{6x^2+24x-30}{2x-6}$$

$$\therefore y = 3(x-1)$$

$$\therefore y = 3x-3$$

$$y\text{-intercept: } y = -3$$

$$x\text{-intercept: } 3x-3 = 0$$

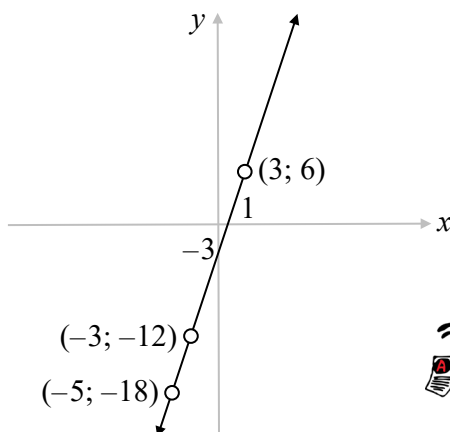
$$\therefore 3x = 3$$

$$\therefore x = 1$$

$$\text{Excluded points: When } x = -3 \quad y = 3(-3)-3 = -12$$

$$\text{When } x = -5 \quad y = 3(-5)-3 = -18$$

$$\text{When } x = 3 \quad y = 3(3)-3 = 6$$



6. $(2x - 4)^2 + (x + 3)^2 = (2x + 1)^2 \quad \dots \text{Pythag}$

$$\therefore 4x^2 - 16x + 16 + x^2 + 6x + 9 = 4x^2 + 4x + 1$$

$$\therefore x^2 - 14x + 24 = 0$$

$$\therefore (x - 2)(x - 12) = 0$$

$$\therefore x = 2 \quad \text{or} \quad x = 12$$



If $x = 2$: $AC = 5$, $AB = 0$ and $BC = 5$ which is not a triangle.

If $x = 12$: $AC = 25$, $AB = 20$ and $BC = 15$

$$\text{Area} = \frac{1}{2} \times BC \times AB$$

$$= \frac{1}{2} \times 15 \times 20$$

$$= 150$$

Also: $\text{Area} = \frac{1}{2} \times AC \times BD$

$$\therefore \frac{1}{2} \times 25 \times BD = 150$$

$$\therefore 25 \times BD = 300$$

$$\therefore BD = 12 \text{ units}$$

