

COMPOSITE TEST SOLUTIONS 21-24

Question 21

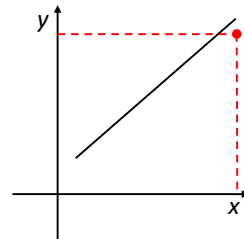
If you fit a line of regression by eye, through which values should the line be drawn?

- A. the maximum values of x and y
- B. the mean values of x and y
- C. the median values of x and y
- D. the minimum values of x and y

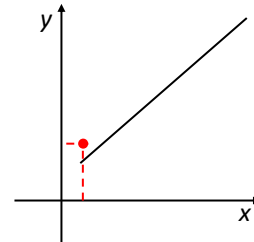
Solution

The regression line is the line of best fit for the data.

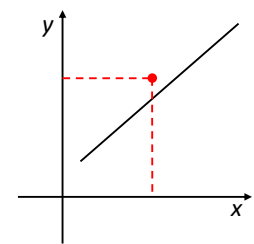
Maximum values are not necessarily on the line.



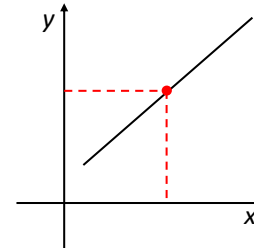
Minimum values are not necessarily on the line.



Median values are not necessarily on the line.



Mean values must be on the line.



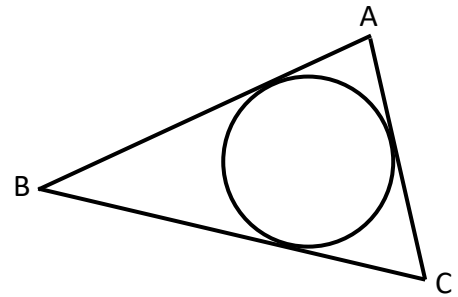
So, the correct answer is B.

Question 22

A circle with radius 5 cm is inscribed in a triangle ABC.

If the perimeter of $\triangle ABC$ is P cm and the area of $\triangle ABC$ is S cm², what is the ratio of $P : S$?

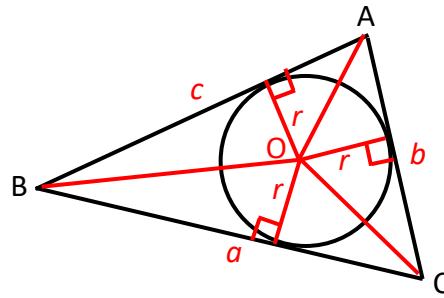
- A. $\sqrt{2} : 5$ B. $2 : \sqrt{5}$ C. $2 : 5$ D. $5 : 2$



Solution

Join centre to vertices.

Draw radii to tangent points.



$$\text{Area}\triangle ABC = \text{Area}\triangle OBC + \text{Area}\triangle OCA + \text{Area}\triangle OAB$$

$$= \frac{1}{2}a \times 5 + \frac{1}{2}b \times 5 + \frac{1}{2}c \times 5$$

$$= \frac{5}{2}(a + b + c)$$

$$\therefore S = \frac{5}{2}P$$

i.e., $P : S = 2 : 5$

So, the correct answer is C.

Question 23

If $f(x+1) = x^2 + 5x + 3$, then what is $f(x-1)$?

- A. $x^2 + 5x + 1$ B. $x^2 + x - 3$ C. $x^2 - 5x + 1$ D. $x^2 + x + 3$

Solution

Express $x - 1$ in terms of $x + 1$.

Put $x - 1 = (x - 2) + 1$

This means that $f(x - 1) = f[(x - 2) + 1]$

$$\begin{aligned}
 \text{i.e., } f(x-1) &= (x-2)^2 + 5(x-2) + 3 \\
 &= x^2 - 4x + 4 + 5x - 10 + 3 \\
 &= x^2 + x - 3
 \end{aligned}$$

So, the correct answer is B.

Question 24

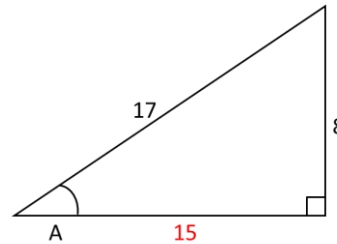
If $\sin \theta = \frac{8}{17}$, what is the value of $\sec A \cos A + \operatorname{cosec} A \cos A$?

- A. $\frac{23}{8}$ B. $\frac{15}{8}$ C. $\frac{8}{15}$ D. $\frac{8}{23}$

Solution

Draw a rt angled triangle showing $\sin A = \frac{8}{17}$

Third side of triangle = 15 (Pythagoras)



$$\therefore \cos A = \frac{15}{17} \text{ and } \sin A = \frac{8}{17}$$

$$\therefore \sec A \cos A + \operatorname{cosec} A \cos A = \frac{17}{15} \times \frac{15}{17} + \frac{17}{8} \times \frac{15}{17}$$

$$= 1 + \frac{15}{8} = \frac{23}{8}$$

So, the correct answer is A.