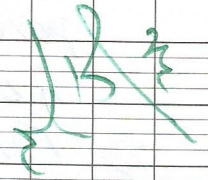


2nd exercise: Part-A:



1) $\triangle ABD$ is right at B. (given)

So, to find AB^2 apply pythagorean theorem.

$$\text{hyp}^2 = \text{leg}_1^2 + \text{leg}_2^2$$
$$AD^2 = AB^2 + BD^2$$

Then, $AB^2 = AD^2 - BD^2$

Thus, $AB^2 = (2x-1)^2 - (2+4)^2$

$$2) E(x) = (2x-1)^2 - (2+4)^2$$
$$= 4x^2 - 4x + 1 - x^2 - 8x - 16$$
$$E(x) = 3x^2 - 12x - 15$$

where $a = 3$, $b = -12$ & $c = -15$

$$3a) (x+4)(3x-24) = 3x^2 - 12x - 96$$

b) $AB = 9$ (given) & $AB^2 = E(x)$ (proved) so $AB^2 = 9^2$

Then, $3x^2 - 12x - 15 = 81$

So, $3x^2 - 12x - 96 = 0$

Then, $(x+4)(3x-24) = 0$ (proved)

hence $x = -4$ or $x = \frac{24}{3} = 8$. but $x > 2$ (cond)

Thus, $x = -4$ rej & $x = 8$ is accepted

4) $\hat{BAO} = 30^\circ$ (given)

$\hat{ABO} = 90^\circ$ (given)

then $\triangle ABO$ is semi equilateral at B.

So $AB = \frac{\sqrt{3}}{2} \times \text{hyp}$ (side facing 60°)

$$AB = \frac{\sqrt{3}}{2} \times AO$$

$$\sqrt{3x^2 - 12x - 15} = \frac{\sqrt{3}}{2} AO$$

$$AO = \frac{2\sqrt{3x^2 - 12x - 15}}{\sqrt{3}}$$

rationalize the denominator

$$AO = \frac{2\sqrt{3}\sqrt{3x^2 - 12x - 15}}{3} \text{ cm}$$

$$BO = \frac{1}{2} \text{ hyp (side facing } 30^\circ)$$

$$BO = \frac{1}{2} AO$$

$$BO = \frac{\sqrt{3}\sqrt{3x^2 - 12x - 15}}{3} \text{ cm}$$

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