

Answers

1.

AREA OF A TRIANGLE

► Length of side AB

$$m \overline{AB} = \sqrt{(7 - 1)^2 + (6 - 3)^2} = \sqrt{36 + 9} = \sqrt{45} \text{ u}$$

► Coordinates of point H

$$x_H = x_A + \frac{1}{3}(x_B - x_A); \quad y_H = y_A + \frac{1}{3}(y_B - y_A)$$

$$x_H = 1 + \frac{1}{3}(7 - 1) \quad y_H = 3 + \frac{1}{3}(6 - 3)$$

$$x_H = 3 \quad y_H = 4$$

We have: H(3, 4)

► Equation of line HC

- Slope of AB = $\frac{6 - 3}{8 - 1} = \frac{1}{2}$

- Slope AB \times slope HC = -1 $\quad (\overline{AB} \perp \overline{HC})$

- Slope HC = -2

$$\text{HC: } y = -2x + b \quad (\text{Functional form})$$

$$4 = -2(3) + b \quad (\text{Point H(3, 4) is on the line HC})$$

$$4 = -6 + b$$

$$b = 10$$

$$\text{HC: } y = -2x + 10$$

► Coordinates of point C

$$0 = -2x + 10 \quad (\text{Point C}(x, 0), \text{located on the } x\text{-axis, is on line HC})$$

$$x = 5$$

We have: C(5, 0)

► Length of the altitude CH

$$m \overline{CH} = \sqrt{(3 - 5)^2 + (4 - 0)^2} = \sqrt{4 + 16} = \sqrt{20} \text{ u}$$

► Area of triangle ABC

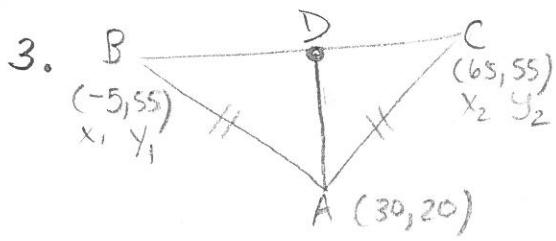
$$\text{Area} = \frac{m \overline{AB} \times m \overline{CH}}{2} \quad (\text{General formula})$$

$$= \frac{\sqrt{45} \times \sqrt{20}}{2}$$

$$= 15 \text{ u}^2$$

► CONCLUSION

The area of triangle ABC is 15 u^2 .



isosceles triangle
2 sides have equal lengths.

$$\text{Area of triangle} = \frac{\text{base} \times \text{height}}{2}$$

\overline{BC} \overline{AD}

Step 1: \overline{BC} find distance

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(65 - (-5))^2 + (55 - 55)^2}$$

$$d = \sqrt{(65 + 5)^2}$$

$$d = \sqrt{70^2}$$

$$d = \sqrt{4900}$$

$$d = 70 \text{ units}$$

Step 2: Midpoint

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$M = \left(\frac{-5 + 65}{2}, \frac{55 + 55}{2} \right)$$

$$M = \left(\frac{60}{2}, \frac{110}{2} \right)$$

$$M = (30, 55)$$

$$D = (30, 55)$$

Step 3: \overline{AD} distance

$$A (30, 20) \quad D (30, 55)$$

$x_1 \quad y_1 \quad x_2 \quad y_2$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(30 - 30)^2 + (55 - 20)^2}$$

$$d = \sqrt{35^2}$$

$$d = \sqrt{1225}$$

$$d = 35 \text{ units}$$

Step 4: Area

$$A = \frac{bxh}{2}$$

$$A = \frac{70 \times 35}{2}$$

$$A = \boxed{1225 \text{ units}^2}$$

4.

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► **Coordinates of point A**

$$y = -\frac{3}{4}x + 72$$

$$y = -\frac{3}{4}(0) + 72 \quad (\text{Point A is located on the } y\text{-axis})$$

$$y = 72$$

We have: A(0, 72)

► **Coordinates of point D**

$$y = -\frac{3}{4}x + 72$$

$$y = -\frac{3}{4}(40) + 72 \quad (\text{Point D is located on line } x = 40)$$

$$y = 42$$

We have: D(40, 42)

► **x-coordinate of point C**

$$x_C = x_A + \frac{2}{5}(x_D - x_A)$$

$$= 0 + \frac{2}{5}(40 - 0)$$

$$= 16$$

► **CONCLUSION**

The length of the fence to be installed by the organizers is 16 m.

