

Chapter Review



Distance and Mid-Point Formulas

- Distance formula finds the distance between two points
- Mid-point formula finds the point that is halfway between two points

Distance Formula

$$d = \sqrt{(x - x_1)^2 + (y - y_1)^2}$$

Example, find the distance between (2, 4) and (5, 10)

$$d = \sqrt{\underset{\uparrow}{x} - \underset{\uparrow}{x_1}^2 + \underset{\uparrow}{y} - \underset{\uparrow}{y_1}^2}$$

2 5 4 10

$$d = \sqrt{(2 - 5)^2 + (4 - 10)^2}$$

$$= \sqrt{(-3)^2 + (-6)^2}$$

$$= \sqrt{9 + 36}$$

$$d = \sqrt{45} \approx 6.70$$

Mid-point formula $\left(\frac{x + x_1}{2}, \frac{y + y_1}{2} \right)$

Example, find the mid-point between

$(6, 2)$ and $(2, 10)$

$$\begin{aligned} \left(\frac{x + x_1}{2}, \frac{y + y_1}{2} \right) &= \left(\frac{6+2}{2}, \frac{2+10}{2} \right) \\ &= \left(\frac{8}{2}, \frac{12}{2} \right) \end{aligned}$$

$(4, 6)$ is halfway
between $(6, 2)$, $(2, 10)$ $MP = (4, 6)$



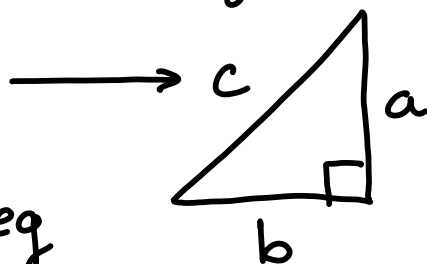
The Pythagorean Theorem

- Finds the length of the legs of a right triangle
- If you know two of the lengths of a right triangle you can find the third

The Pythagorean Theorem

Given right triangle

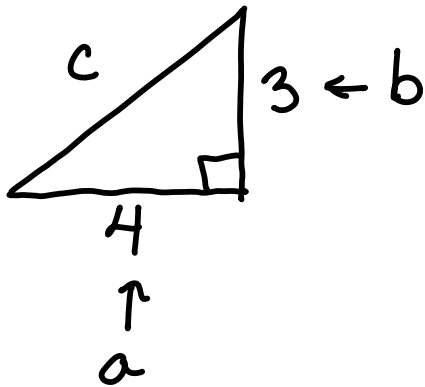
Note - c
is always
the longest leg



$$a^2 + b^2 = c^2$$

Examples,

Find the length of the missing legs



$$a^2 + b^2 = c^2$$

$$4^2 + 3^2 = c^2$$

$$16 + 9 = c^2$$

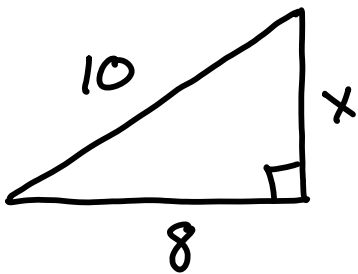
$$25 = c^2$$

Find c by taking square root of both sides

$$c^2 = 25$$

$$\sqrt{c^2} = \sqrt{25}$$

$$c = 5 \leftarrow \text{answer}$$



$$\left. \begin{array}{l} c = 10 \\ a = 8 \\ b = x \end{array} \right\}$$

plug-in

$$a^2 + b^2 = c^2$$

$$8^2 + x^2 = 10^2$$

$$64 + x^2 = 100$$

$$\begin{array}{r} -64 \qquad -64 \\ \hline \end{array}$$

\leftarrow get x^2 isolated

$$x^2 = 36$$

$$\sqrt{x^2} = \sqrt{36}$$

$$x = 6 \leftarrow \text{answer}$$