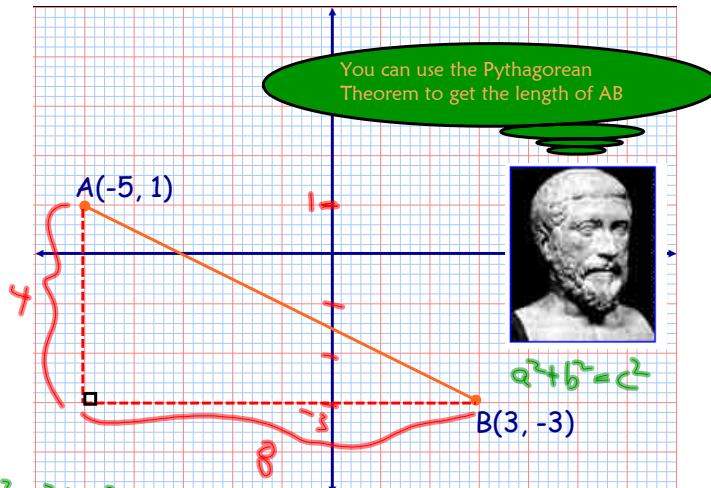


Distance between two points



$$4^2 + 8^2 = (AB)^2$$

$$16 + 64 = (AB)^2$$

$$\sqrt{80} = \sqrt{(AB)^2}$$

$$\sqrt{80} = AB$$

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

$$AB = 8.9 \quad \text{OR} \quad AB = \sqrt{4^2 + 8^2} = 2\sqrt{20} = 2(\sqrt{4} \times \sqrt{5}) = 4\sqrt{5}$$

Review of Operations with Radicals

Simplifying

Examples...

#1. Use the distance formula to show that the triangle with vertices A(-3, 1); B(1, 7) & C(5, 1) is isosceles.

$$AB = \sqrt{(-3-1)^2 + (1-7)^2} \quad BC = \sqrt{(5-1)^2 + (7-1)^2} \quad AC = \sqrt{(5-3)^2 + (1-1)^2}$$

$$AB = \sqrt{16+36} \quad BC = \sqrt{16+36} \quad AC = \sqrt{6+0}$$

$$AB = \sqrt{52} \quad BC = \sqrt{52} \quad AC = 8$$

$AB = BC \therefore$ isosceles

#2. Show that the points (5, -1); (2, 8) & (-2, 0) lie on a circle whose center is (2, 3)

$$AO = \sqrt{(2-2)^2 + (8-3)^2} = \sqrt{0+25} = 5$$

$$BO = \sqrt{(5-2)^2 + (-1-3)^2} = \sqrt{9+16} = 5$$

$$CO = \sqrt{(-2-2)^2 + (0-3)^2} = \sqrt{16+9} = 5$$

ALL are equidistant FROM (2, 3)

Midpoint of a Line

$$MP = \left(\frac{5+3}{2}, \frac{6+14}{2} \right) \quad \leftarrow \text{Think Finding Average}$$

$$MP = (1, 10) \quad A(-3, 6)$$

$$\text{midpoint } (x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Examples

- #1. The endpoints of a diameter of a circle are $(-5, 6)$ and $(11, -12)$. Find the coordinates of the center of the circle.

$$MP = \left(\frac{-5+11}{2}, \frac{6+(-12)}{2} \right)$$

$MP = (3, -3)$

- #2. One endpoint of a line segment is $(-4, 3)$. The midpoint is $(-3, 6)$. Find the other endpoint.

$$\begin{aligned} \text{Midpoint } x: \quad \frac{-4+x}{2} &= -3 \quad (1) \\ -4+x &= -6 \\ x &= -6+4 \\ x &= -2 \end{aligned}$$

$$\begin{aligned} \text{Midpoint } y: \quad \frac{3+y}{2} &= 6 \quad (2) \\ 3+y &= 12 \\ y &= 12-3 \\ y &= 9 \end{aligned}$$

$(-2, 9)$

- #3. If the line segment joining $(-4, y)$ to $(x, -3)$ is bisected at $(1, -1)$, find the value of x and y .

$$\begin{aligned} \text{Midpoint } x: \quad \frac{-4+x}{2} &= 1 \quad (1) \\ -4+x &= 2 \\ x &= 6 \end{aligned}$$

$$\begin{aligned} \text{Midpoint } y: \quad \frac{y+(-3)}{2} &= -1 \quad (2) \\ y-3 &= -2 \\ y &= 1 \end{aligned}$$

$$(-7, 10) \quad (3, -12)$$

MP = ??

$$MP = \left(\frac{-7+3}{2}, \frac{10+(-12)}{2} \right)$$


$$MP = (-2, -1)$$

$$(3, -13) \quad \& \quad (11, -5)$$

A green bracket above the two points is labeled with the number 14. Small green checkmarks are present above each point.

$$(-7, -9)$$

Homework...

 Worksheet - Distance and Midpoint.doc

Sec. 6.6

2 (b) , (d)

#5 (b)

6, 7, 8, 9, 10

Sec. 6.7

1 (b), (c), (e), (g)

#3, 4, 5, 6