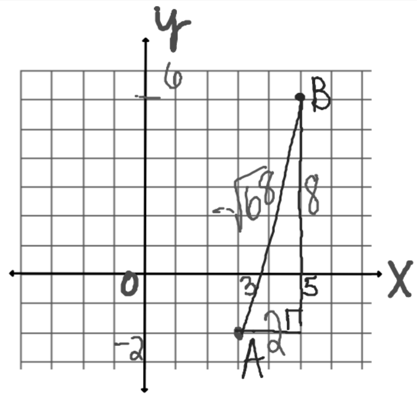
13-1 / 13-5 Distance and Midpoint

Dec. 9



ex. 1 **Find the distance between A (3, -2) and B (5, 6).**

x, y

$AB^2 = 2^2 + 8^2$ Pythagorean Theorem

$AB^2 = 68$

$AB = \sqrt{68} = \sqrt{4}\sqrt{17} = 2\sqrt{17}$

Distance formula: The distance between points (x_1, y_1) and (x_2, y_2) is $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

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ex. 2 **Find the distance between (9, -4) and (1, -8).**

x_1, y_1 x_2, y_2

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

$d = \sqrt{(9-1)^2 + (-4-(-8))^2} = \sqrt{8^2 + 4^2} = \sqrt{80}$

64 16

$= 4\sqrt{5}$

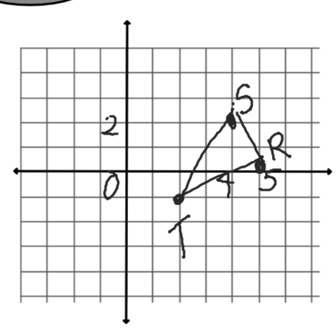
$\sqrt{16} \cdot \sqrt{5}$

$\sqrt{4} \cdot \sqrt{20}$

$\sqrt{4}\sqrt{4}\sqrt{5}$

$2 \cdot 2\sqrt{5}$

ex. 3 **Show that △RST is scalene. R(5, 0), S(4, 2), T(2, -1)**



$RS = \sqrt{(5-4)^2 + (0-2)^2} = \sqrt{1 + 4} = \sqrt{5}$

$ST = \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13}$

$RT = \sqrt{(5-2)^2 + (0-(-1))^2} = \sqrt{9 + 1} = \sqrt{10}$

The midpoint of a segment with endpoints (x_1, y_1) and (x_2, y_2) is $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$. (average of x's + y's)

x_1, y_1 x_2, y_2

ex. 4 **Find the midpoint of $\overline{JK}$. J (6, -3) K (-2, -6)**

$$\text{midpt}\left(\frac{\overset{4}{6+^-2}}{2}, \frac{-3+^-6}{2}\right) = \left(2, \frac{-9}{2}\right)$$

$(2, -4.5)$

ex. 5 **M (4, -2) is the midpoint of $\overline{CD}$. If C is (2, -5), find D.**

C(2,-5) M(4,-2) D(x, y)

(6, 1)

$$\cancel{2}\frac{2+x}{\cancel{2}} = (4)2 \qquad \frac{-5+y}{2} = \frac{-2}{1}$$

$2+x=8$ $-5+y=-4$