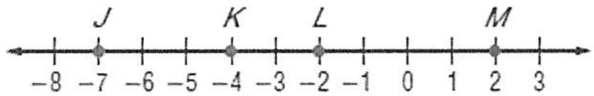
Distance classwork

KEY

Ex #1: Use the number line to find each measure



a) KM 6 b) JM 9

c) KL 2 d) JL 5

Notice how the space between the points is technically the **difference** between the numbers?

On a Coordinate Plane

- Method 1 – Pythagorean Theorem
  - Graph points
  - $a^2 + b^2 = c^2$
- Method 2 – Distance formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Ex #2: Use the Pythagorean Theorem to find the distance between each pair of points.

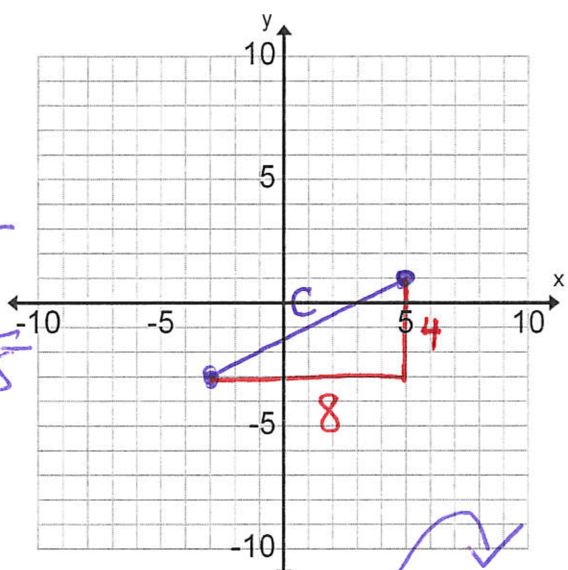
a) $R(5, 1)$, $S(-3, -3)$ b) $E(-4, 1)$, $F(3, -1)$

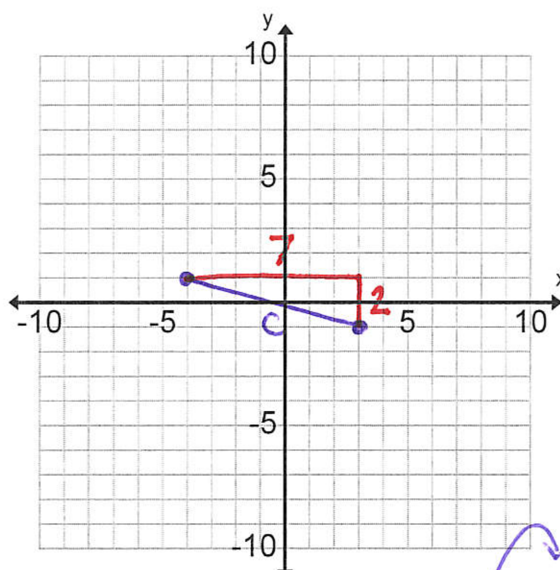
$* \sqrt{80}$

$\sqrt{16 \cdot 5}$

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

$4\sqrt{5}$





$8^2 + 4^2 = c^2$

$64 + 16 = c^2$

$80 = c^2$

$* \sqrt{80} = c$

$\boxed{c = 4\sqrt{5}}$

$7^2 + 2^2 = c^2$

$49 + 4 = c^2$

$53 = c^2$

$\boxed{c = \sqrt{53}}$

Ex #3: Use the Distance Formula to find the distance between each pair of points.

a) *D* (-5, 6), *E* (8, -4)

$$d=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$$
$$=\sqrt{(-5-8)^2+(6--4)^2}$$
$$=\sqrt{(-13)^2+(10)^2}$$
$$=\sqrt{169+100}$$
$$=\sqrt{269}$$

b) *G* (2, 0), *H* (8, 6)

$$d=\sqrt{(2-8)^2+(0-6)^2}$$
$$=\sqrt{(-6)^2+(-6)^2}$$
$$=\sqrt{36+36}$$
$$=\sqrt{72}$$
$$=\sqrt{36\cdot 2}=\boxed{6\sqrt{2}}$$

c) *J* (0, 0), *K* (6, 8)

$$d=\sqrt{(0-6)^2+(0-8)^2}$$
$$=\sqrt{(-6)^2+(-8)^2}$$
$$=\sqrt{36+64}$$
$$=\sqrt{100}$$
$$=\boxed{10}$$

d) *K* (6, 8), *J* (0, 0)

$$d=\sqrt{(6-0)^2+(8-0)^2}$$
$$=\sqrt{6^2+8^2}$$
$$=\sqrt{36+64}$$
$$=\sqrt{100}$$
$$=\boxed{10}$$

Did you notice that problems c) and d) were the same points in reverse? This means that the distance between J and K **is the same as the distance** between K and J.

In other words, it doesn't matter what point is used for x1 and y1. That's good news!

Also think about this: the formula *squares* the difference. Isn't it true that:

$$8-5\neq 5-8$$

But

$$(8-5)^2=(5-8)^2$$

Yes, squaring the differences makes them the same - WOW!