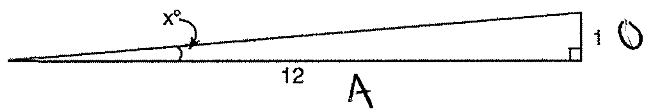
NAME: Key DATE:____________________ PRD:____

DO NOW

1. To build a handicapped-access ramp, the building code states that for every 1 inch of vertical rise in height, the ramp must extend out 12 inches horizontally, as shown in the diagram below.



What is the angle of inclination, x, of this ramp, to the *nearest hundredth of a degree*?

1) 4.76
2) 4.78
3) 85.22
4) 85.24

$(\tan x)^{-1} = \left(\frac{1}{12}\right)^{-1}$

$x = 4.76$

2. In a right triangle, $\sin(40 - x)^\circ = \cos(3x)^\circ$. What is the value of x? CO FUNCTIONS!

1) 10
2) 15
3) 20
4) 25

$40 - x + 3x = 90$

$40 + 2x = 90$

$2x = 50$

$x = 25$

3. The coordinates of point A are $(4, 8)$, the coordinates of point B are $(4, 2)$ and the coordinates of point C are $(1, 2)$. What is the length of $\overline{AC}$, in simplest radical form?

Pythagorean Theorem.

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

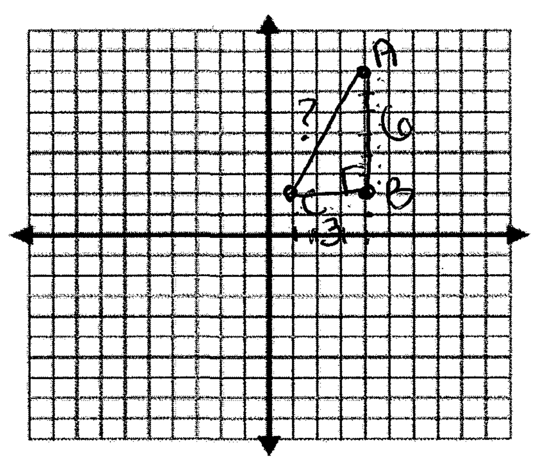
$3^2 + 6^2 = c^2$

$\sqrt{45} \quad \sqrt{c^2}$

$c = \sqrt{45}$

$c = \sqrt{9}\sqrt{5}$

$\boxed{c = 3\sqrt{5}}$



HOW DO WE DETERMINE THE DISTANCE BETWEEN TWO POINTS?!?!?

DISTANCE FORMULA

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

Example #1:

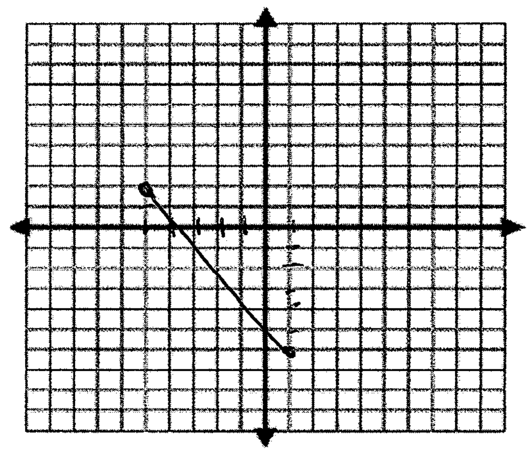
Find the distance between the points $(-5, 2)$ and $(1, -6)$.

$x_1 \; y_1 \qquad x_2 \; y_2$

$$d = \sqrt{(1 - -5)^2 + (-6 - 2)^2}$$

$$d = \sqrt{100}$$

$$\boxed{d = 10}$$



Example #2:

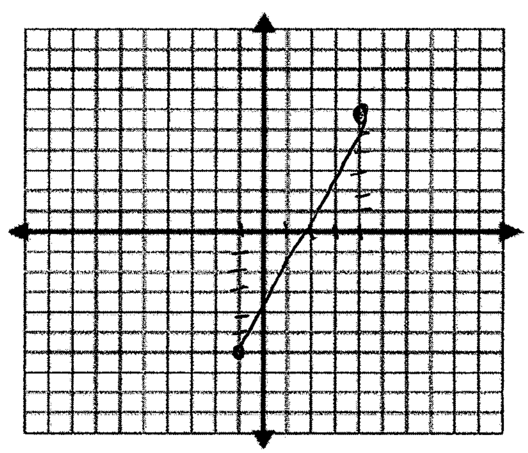
Find the length of the line segment whose endpoints are $(-1, -6)$ and $(4, 6)$.

$x_1 \; y_1 \qquad x_2 \; y_2$

$$d = \sqrt{(4 - -1)^2 + (6 - -6)^2}$$

$$d = \sqrt{169}$$

$$\boxed{d = 13}$$



Example #3:

$x_1\ y_1 \qquad x_2\ y_2$

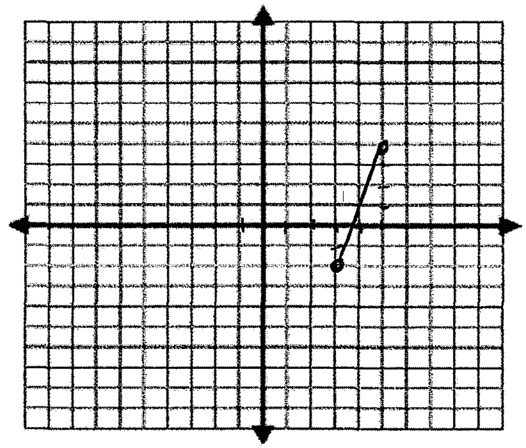
Find the length of the line segment whose endpoints are $(3, -2)$ and $(5, 4)$.

$$d = \sqrt{(5-3)^2 + (4 - {}^-2)^2}$$

$$d = \sqrt{40}$$

$$\sqrt{4}\ \sqrt{10}$$

$$\boxed{d = 2\sqrt{10}}$$



Example #4:

$x_1\ y_1$

The point $(5, 4)$ lies on a circle. What is the length of the radius of this circle is the center is located at point $(3, 2)$?

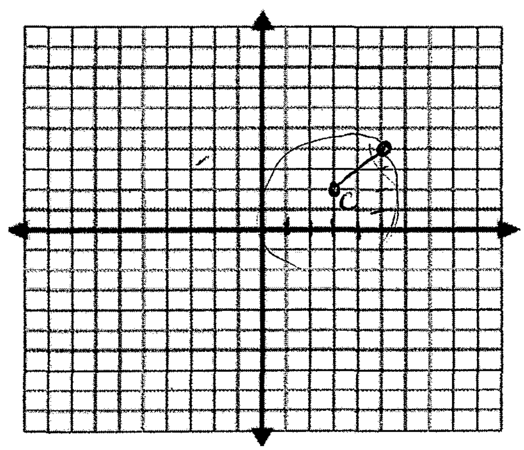
$x_2\ y_2$

$$d = \sqrt{(3-5)^2 + (2-4)^2}$$

$$d = \sqrt{8}$$

$$\sqrt{4}\ \sqrt{2}$$

$$\boxed{d = 2\sqrt{2}}$$



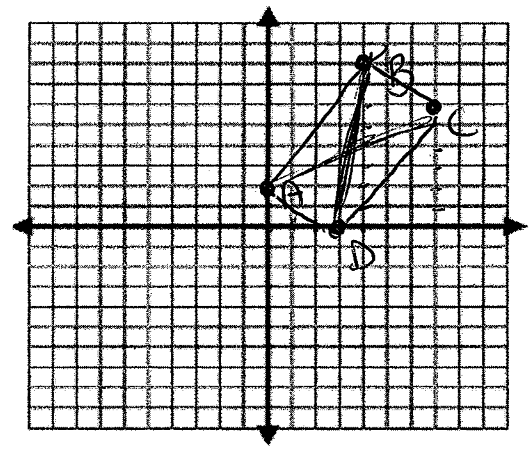
Example #5:

$x_1 y_1$ $x_2 y_2$

The coordinates of rectangle ABCD are $A(0, 2)$, $B(4, 8)$, $C(7, 6)$, $D(3, 0)$. Show that the diagonals are equal in length.

$x_1 y_1$ $x_2 y_2$

Diagonal $\overline{BD}$ =



$d = \sqrt{(3-4)^2 + (0-8)^2}$

$d = \sqrt{65}$

Diagonal $\overline{AC}$

$d = \sqrt{(7-0)^2 + (6-2)^2}$

$d = \sqrt{65}$

since the distances of $\overline{AC}$ and $\overline{BD}$ are ≅, the diagonals are ≅.

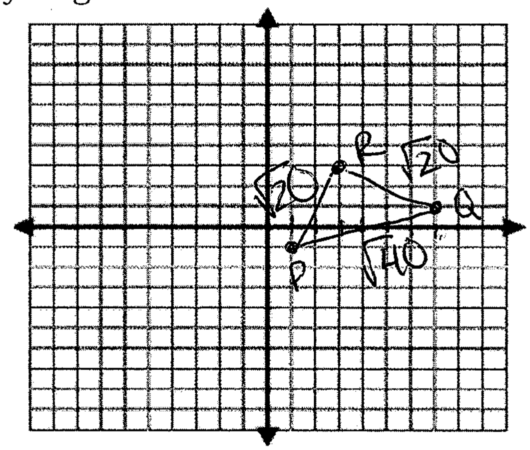
Example #6:

x_1 y_1 x_2 y_2

The vertices of a triangle are $P(1,-1)$, $Q(7,1)$, *and* $R(3,3)$.

a) Show that ΔPQR is an isosceles triangle.

b) Show that ΔPQR is a right triangle using the Pythagorean Theorem.



a) isosceles $\Delta \rightarrow 2 \cong$ sides

$\overline{PQ} = \sqrt{(7-1)^2 + (1-{}^-1)^2}$

$\overline{PQ} = \sqrt{40}$

$\overline{QR} = \sqrt{(3-7)^2 + (3-1)^2}$

$\overline{QR} = \sqrt{20}$

$\overline{PR} = \sqrt{(3-1)^2 + (3-{}^-1)^2}$

$\overline{PR} = \sqrt{20}$

ΔPQR is an isosceles Δ b/c $\overline{PR} \cong \overline{QR}$

b) $a^2 + b^2 = c^2 \rightarrow$ largest side ($\sqrt{40}$)

$(\sqrt{20})^2 + (\sqrt{20})^2 = (\sqrt{40})^2$

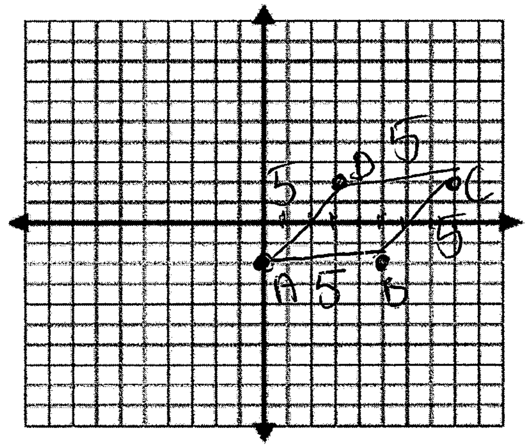
$40 = 40$ ✓

ΔPQR is a right Δ b/c it satisfies the pythagorean theorem

Example #7:

The vertices of a quadrilateral are $A(0,-2), B(5,-2),\ C(8,2),\ D(3,2)$. Prove that the quadrilateral is a rhombus using the distance formula.

rhombus - 4 $\cong$ sides



$\overline{AB} = \sqrt{(5-0)^2 + (-2--2)^2}$

$\overline{AB} = \sqrt{25} = 5$

$\overline{BC} = \sqrt{(8-5)^2 + (2--2)^2}$

$\overline{BC} = \sqrt{25} = 5$

$\overline{CD} = \sqrt{(3-8)^2 + (2-2)^2}$

$\overline{CD} = \sqrt{25} = 5$

$\overline{AD} = \sqrt{(3-0)^2 + (2--2)^2}$

$\overline{AD} = \sqrt{25} = 5$

Quad. ABCD is a rhombus b/c all sides are $\cong$.

EXTRA PRACTICE!!!! WHAT FUN!!!

1. Find the distance between the points $A(1,2), B(3,4)$, in simplest radical form.

$$d = \sqrt{(3-1)^2+(4-2)^2}$$
$$d = \sqrt{8}$$
$$\sqrt{4}\ \sqrt{2}$$
$$\boxed{d = 2\sqrt{2}}$$

2. Find the distance between the points $A(-5,2), B(1,-6)$.

$$d = \sqrt{(1--5)^2+(-6-2)^2}$$
$$d = \sqrt{100}$$
$$\boxed{d = 10}$$

3. Find the distance between the points $A(6,2), B(1,-3)$, in simplest radical form.

$$d = \sqrt{(1-6)^2+(-3-2)^2}$$
$$d = \sqrt{50}$$
$$\sqrt{25}\ \sqrt{2}$$
$$\boxed{d = 5\sqrt{2}}$$

4. Find the distance between the points $A(-3,3), B(3,-3)$, in simplest radical form.

$$d = \sqrt{(3--3)^2+(-3-3)^2}$$
$$d = \sqrt{72}$$
$$d = \sqrt{36}\sqrt{2}$$
$$\boxed{d = 6\sqrt{2}}$$

Example #5:

The vertices of a triangle are $L(1,-1)$, $M(7,-3)$, *and* $N(2,2)$.

a) Show that ΔLMN is a scalene triangle.

b) Show that ΔLMN is a right triangle using the Pythagorean Theorem.

c) Show that the midpoint of $\overline{MN}$ is equidistant from the vertices.

a) scalene Δ - no $\cong$ sides