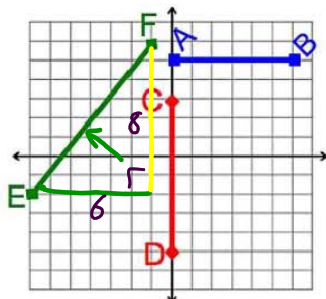


Geometry CC – Mr. Valentino  
Unit 10 Lesson 3: Distance Formula!

Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Per: \_\_\_\_\_

Aim: How can we find the length of a line segment?

Do Now: Find the length of each line segment below. Show/explain the process you took to find the length of each line.



AB: 6 units

CD: 8 units

EF:  $a^2 + b^2 = c^2$   
 $6^2 + 8^2 = c^2$   
 $36 + 64 = c^2$   
 $100 = c^2$   
 $c = 10$  units

\*How did you calculate the length of AB and CD? Can you use the same method to calculate EF? Why/Why not?

we counted the boxes

When a line is DIAGONAL through the coordinate plane we cannot simply count boxes

DISTANCE FORMULA

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

Midpoint Formula  
 $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$

★ the advantage of using the distance formula is that you do not need to draw a right  $\Delta$  to find the answer. All you need are the endpoint coordinates

Find the distance between the points below. Leave your answer in simplest radical form.

1. (0, -2) and (-5, -1)  
 $x_1, y_1, x_2, y_2$

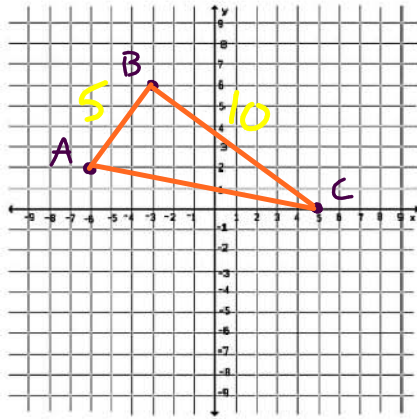
$$\begin{aligned} &\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-5 - 0)^2 + (-1 - (-2))^2} \\ &= \sqrt{(-5)^2 + (1)^2} \\ &= \sqrt{25 + 1} \\ &= \sqrt{26} \end{aligned}$$

2. (-6, 4) and (-5, 1)  
 $x_1, y_1, x_2, y_2$

$$\begin{aligned} d &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-5 - (-6))^2 + (1 - 4)^2} \\ &= \sqrt{(1)^2 + (-3)^2} \\ &= \sqrt{1 + 9} \\ &= \sqrt{10} \end{aligned}$$

$\sqrt{(-5-0)^2 + (-1-(-2))^2}$	5.099019514
$\sqrt{26}$	5.099019514

3. Triangle ABC has coordinates A (-6,2), B(-3,6), and C (5,0). Find the perimeter of the triangle.  
Express your answer in simplest radical form.



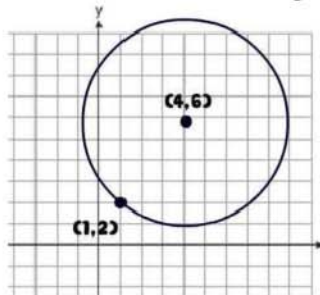
$$\begin{aligned}
 & \text{A and B} && \text{B and C} \\
 & \sqrt{(-3+6)^2 + (6-2)^2} && \sqrt{(5+3)^2 + (0-6)^2} \\
 & \sqrt{(3)^2 + (4)^2} && \sqrt{(8)^2 + (-6)^2} \\
 & \sqrt{9+16} && \sqrt{64+36} = \sqrt{100} \\
 & \sqrt{25} && = 10 \\
 & 5 && \\
 & \text{A and C} \\
 & \sqrt{(5+6)^2 + (0-2)^2} \\
 & \sqrt{(11)^2 + (-2)^2} \\
 & \sqrt{121+4} = \sqrt{125} \\
 & 15 + 5\sqrt{5} && \sqrt{25}\sqrt{5} \\
 & && 5\sqrt{5}
 \end{aligned}$$

Practice Problems...yeah!

(Round all answers to the nearest tenth where necessary)

1. Find the length of the line segment whose endpoints are (-8,7) and (6,4).

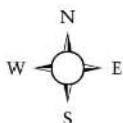
2. The point (1,2) lies on a circle. What is the length of the radius of this circle if the center is located at (4,6)?



3. Line segment AB has endpoints A(0, -6) and B(5, 6). Line segment CD has endpoints C(-8, 2) and D(4, 7). Are these segments congruent? How do you know?

4. The point  $(-3,3)$  lies on a circle. If the center is located at  $(10,6)$  what is the length of the diameter of this circle?

5. One bus is 5 miles east and 2 miles north of the bus terminal. Another bus is 3 miles west and 6 miles south of the terminal. How far apart are the buses?



6. Find the perimeter of triangle VUW.

