

## Unit 4 Lesson 4 – Midpoint and Distance

- Midpoint: the point in the **MIDDLE** of two points

1. To find the midpoint:

- X - value = **ADD** the x-values and divide by **2**
- Y-value = **ADD** they y-values and divide by **2**
- Midpoint =  $(\frac{x + x}{2}, \frac{y + y}{2})$

### EXAMPLES

1. Find the midpoint of the line created by the points (-4, -6) and (10, 14)

- Midpoint =  $(\underline{-2}, \underline{4})$

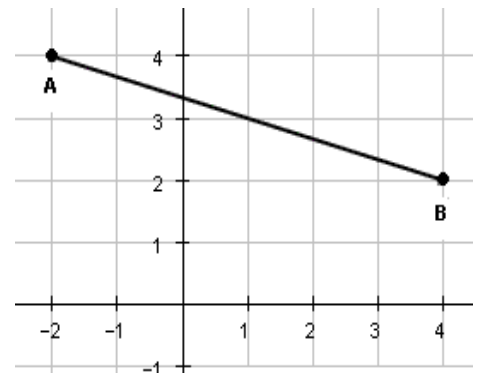
2. Find the midpoint of the line created by the points (9, 0) and (-1, 3)

3.

- Midpoint =  $(\underline{4}, \underline{1.5})$

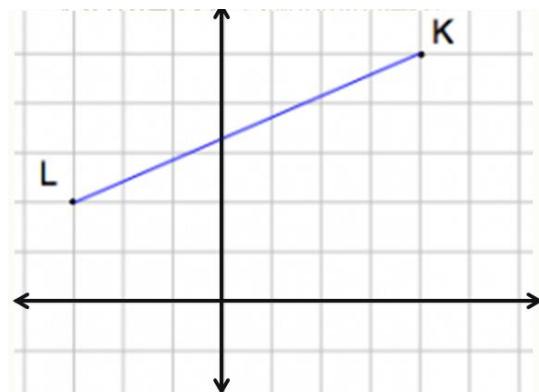
4. Find the midpoint of AB graphed to the right.

- Point A =  $(\underline{-2}, \underline{4})$  Point B =  $(\underline{4}, \underline{2})$
- Midpoint =  $(\underline{1}, \underline{3})$



5. Find the midpoint of LK graphed to the right.

- Point L =  $(\underline{-3}, \underline{2})$  Point K =  $(\underline{4}, \underline{5})$
- Midpoint =  $(\underline{0.5}, \underline{3.5})$



### Distance Formula

- Formula for Finding the Distance between two point:

$$d = \sqrt{(x - x)^2 + (y - y)^2}$$

- Find the distance between (4, -7) & (10, 5)

$$d = \sqrt{(4 - 10)^2 + (-7 - 5)^2}$$

**d=13.42**

- Find the distance between (3, 1) and (-8, 4)

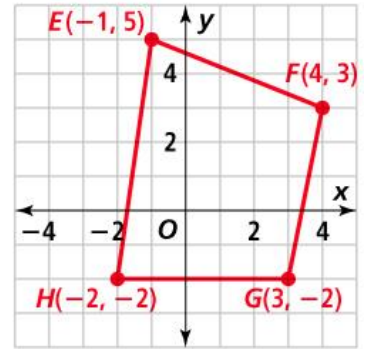
$$d = \sqrt{(3 - -8)^2 + (1 - 4)^2}$$

**d=11.40**

**Applications of the Distance Formula:**

You are building a fence to enclose an area as shown in the diagram. Approximately, how many feet of fencing will be required?

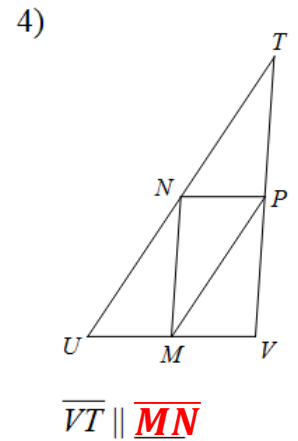
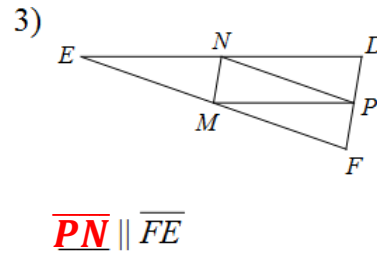
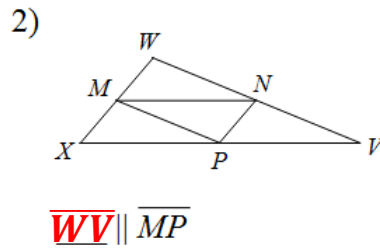
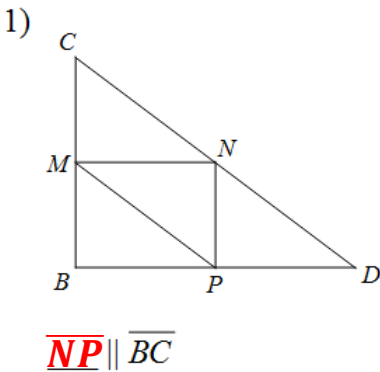
$d = 5.39 + 7.07 + 5 + 5.09 =$  **22.56**



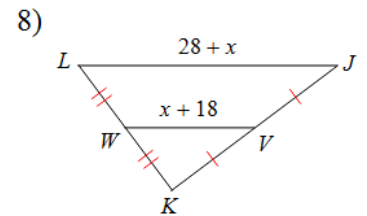
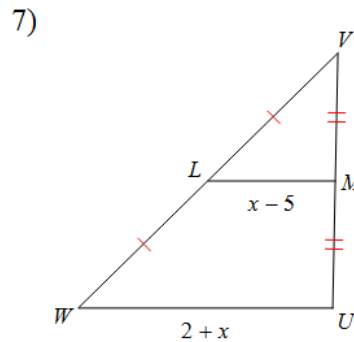
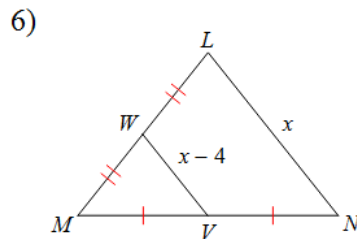
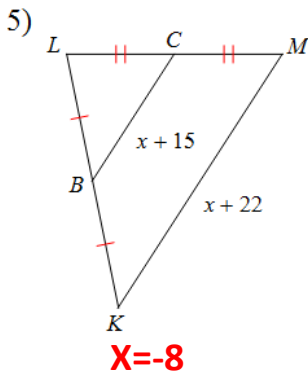
**Triangle Midsegment Theorem**

- If a segment joins the midpoints of two sides of a triangle, then the segment is parallel to the third side, and is half its length.

In each triangle, M, N, and P are the midpoints of the sides. Name a segment parallel to the one given.

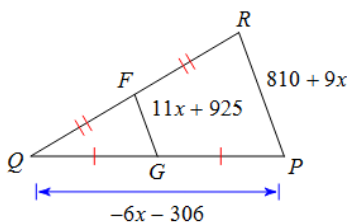


Each triangle below has a midsegment. Using the triangle midsegment theorem, find the value of x.



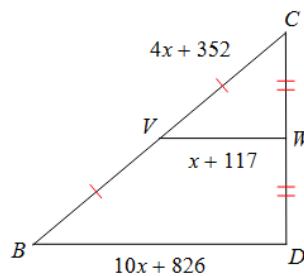
Find the length of the side indicated.

9) Find  $PR = 90$



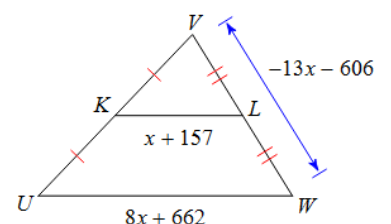
**X = -80**

10) Find  $VW = 43$



**X = -74**

11) Find  $KL = 99$

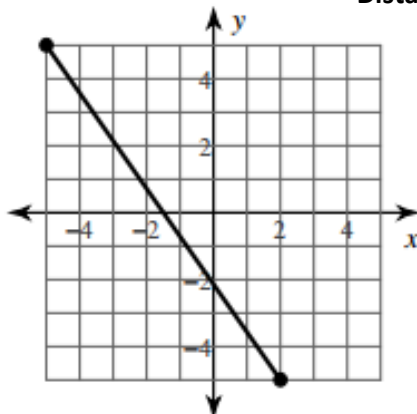
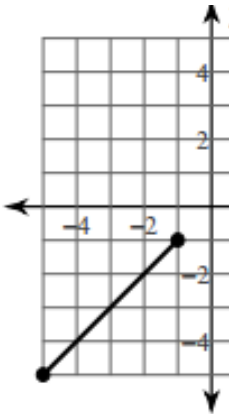


**X = -58**

# Unit 4 Lesson 4 Practice – Midpoint, Distance, and Triangle Midsegment

Find the midpoint and length of each line segment below:

- 1) Midpoint:  $(-3, -3)$       Distance:  $d=5.7$       Distance:  $d=12.2$        $(\frac{3}{2}, 0)$

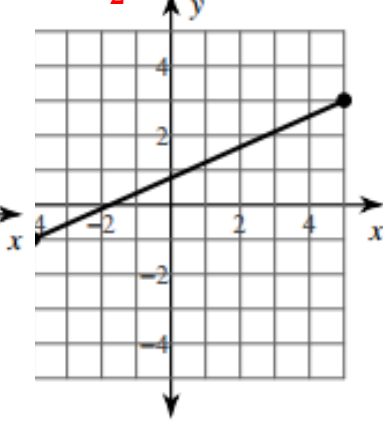
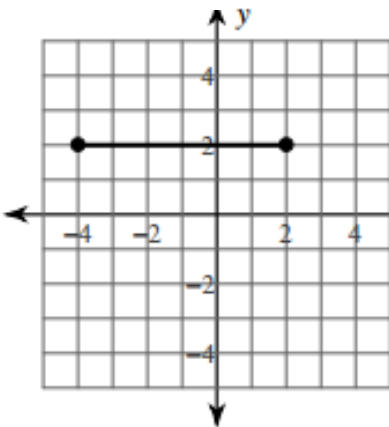


Distance:  $d=6$

Midpoint:  $(\frac{1}{2}, 2)$

Distance:  $d=9.2$

Distance: \_\_\_\_\_



Find the Distance and Midpoint of the two points below:

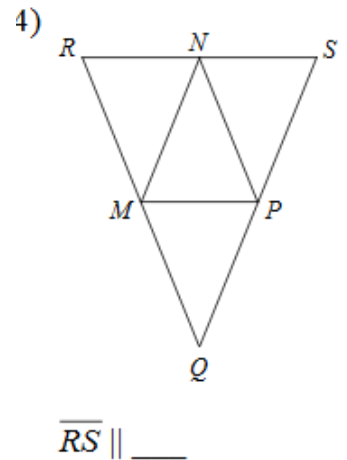
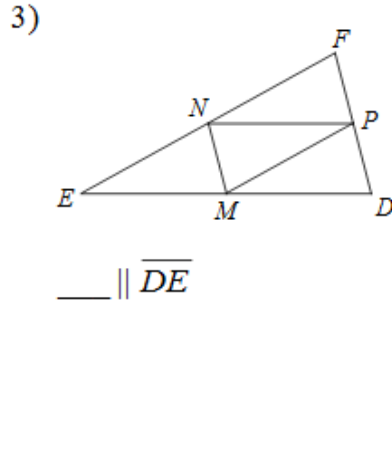
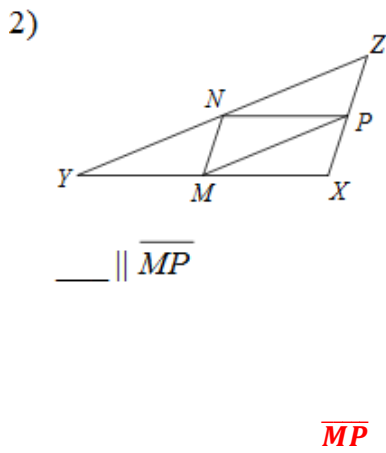
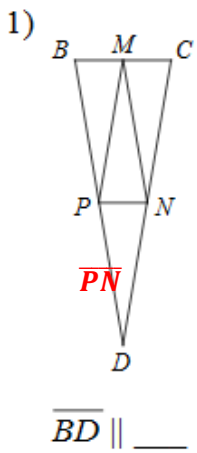
- 5)  $(-4, 4), (5, -1)$       Midpoint  $(\frac{1}{2}, \frac{3}{2})$       Distance  $d=10.3$

- 6)  $(2, 4), (1, -3)$       Midpoint  $(\frac{3}{2}, \frac{1}{2})$       Distance  $d=70.07$

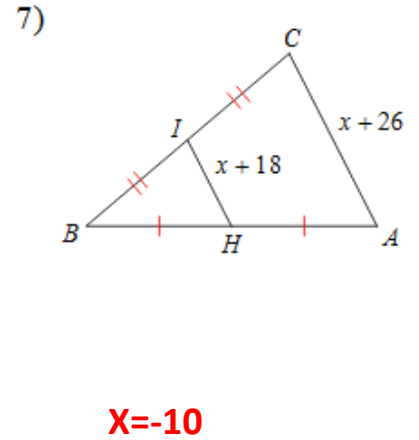
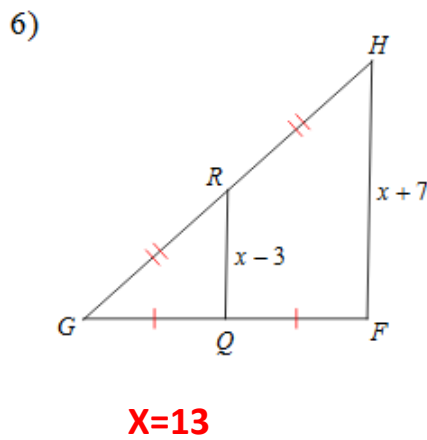
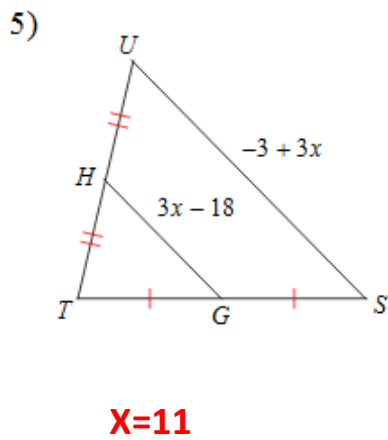
- 7)  $(5, 2), (-4, -3)$       Midpoint  $(\frac{1}{2}, -\frac{1}{2})$       Distance  $d=10.3$

- 8)  $(-1, -6), (-6, 5)$       Midpoint  $(-\frac{7}{2}, -\frac{11}{2})$       Distance  $d=12.08$

In each triangle, M, N, and P are the midpoints of the sides. Name a segment parallel to the one given.



Each triangle below has a midsegment. Using the triangle midsegment theorem, find the value of x.



Find the length of the side indicated.

