

Warm Up

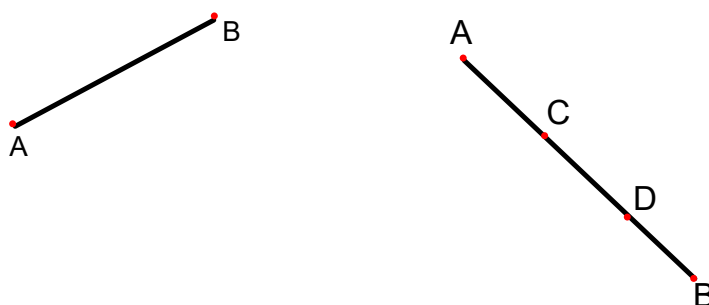
$$5. \frac{-(-5) \pm \sqrt{5^2 - 4(1)(-6)}}{2(1)}$$

$$6. \frac{\frac{4}{5}}{2 - \frac{1}{3}}$$

Section 1.2 Segments, Rays, Parallel Lines and Planes

Objective: To identify segments and rays and to recognize parallel lines.

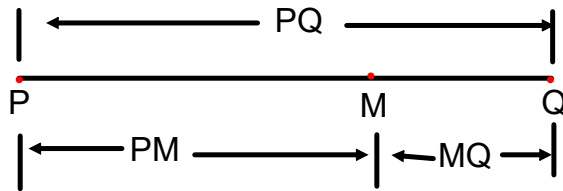
A *Segment* is part of a line consisting of two end points and all points between them. Unlike a line, a segment can be measured because of it has endpoints.



A segment is named by its two endpoints. The above diagram can be named \overline{AB} , read, segment AB.

Points C and D are considered points between A and B.





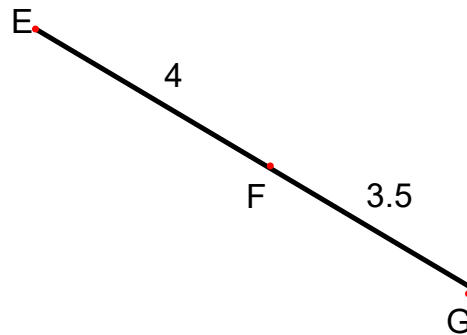
Point M is **between** points P and Q if and only if P, Q and M are colinear and $PM + MQ = PQ$

Example 1

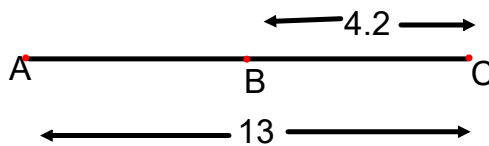
Find each measure. Assume that the figures are not drawn to scale.

a. EG

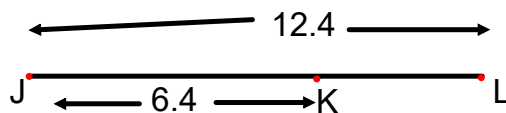
EG is the measure of \overline{EG}



b. AB

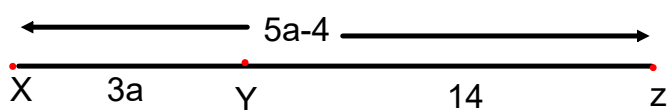


c. KL

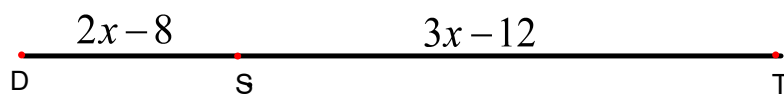


Example 2

Find the value of XY



If DT is 50, find the value of x



If AB = 25, find the value of x

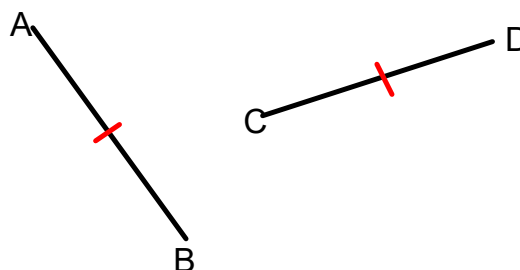


If two geometric figures have exactly the same shape and size, they are **CONGRUENT**. \cong

Lengths are equal and segments are congruent.

$$AB = CD, \quad \overline{AB} \cong \overline{CD}$$

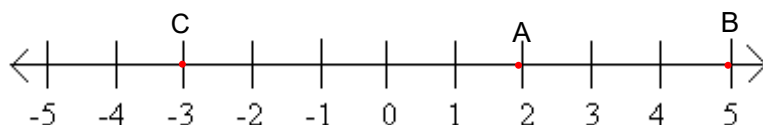
The red hash mark indicates the two segments are congruent.



Distance between two points.

The **distance** between two points is the length of the segments with those points as its endpoints. The coordinates of the points can be used to find this length.

The distance between two points is the absolute value of the difference between their coordinates.



$$|-3 - 5| = |-8| = 8$$

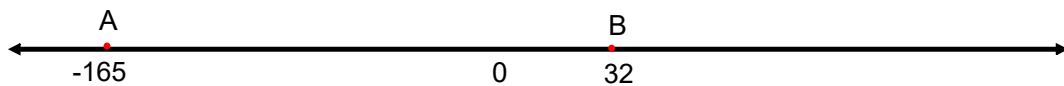
What is the distance between A and B?

What is the distance between C and B?

-3 is called the **coordinate** of C.

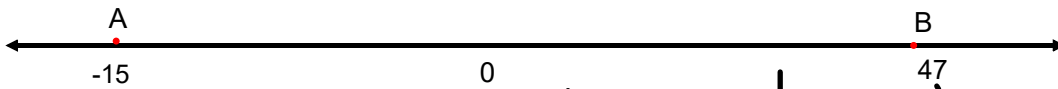
2 is called the **coordinate** of A.

Example. What is the distance between A and B?

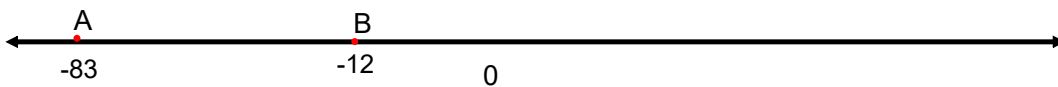


$$AB = 32 - (-165) = 197$$
$$| -165 - 32 | = | -197 | = 197$$

Find AB

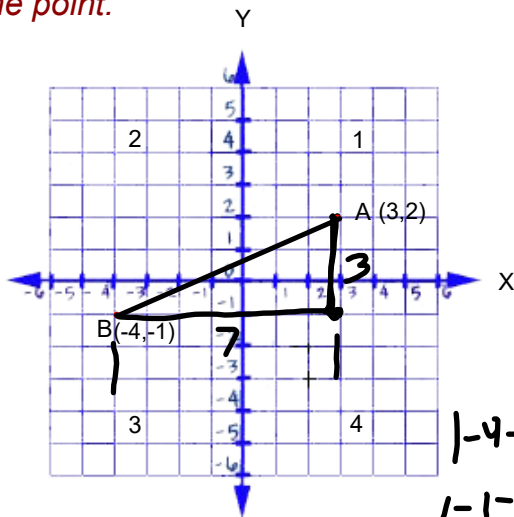


$$| -15 - 47 | = | -62 | = 62$$



$$| -83 - (-12) | = 71$$

In geometry, you describe a point by an *ordered pair* (x,y), called the *coordinate of the point*.



To find the distance between two points in the coordinate plane, we can use the Pythagorean Theorem.

Draw a right triangle in which AB is the hypotenuse.

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

$$c^2 = 7^2 + 3^2$$

$$c^2 = 49 + 9$$

$$\sqrt{c^2} = \sqrt{58}$$

$$c = \sqrt{58}$$

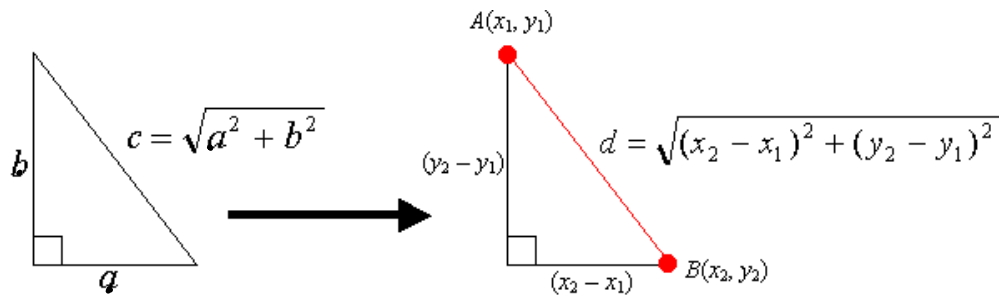
- 4
- 9
- 16
- 25
- 36
- 49
- 64
- 81

$$\sqrt{48}$$

$$\sqrt{16} \sqrt{3}$$

$$+ \sqrt{3}$$

The Distance Formula in the Coordinate plane



Example. Find the distance between each pair of points.

a. C(-4,-6) and D(5,-1)

$$\begin{array}{ccc}
 x_1, y_1 & x_2, y_2 & \\
 \text{C}(-4, -6) & \text{D}(5, -1) & \\
 \end{array}
 \quad CD = \sqrt{(5 - (-4))^2 + (-1 - (-6))^2}$$

$$\sqrt{9^2 + 5^2} = \sqrt{81 + 25} = \sqrt{106}$$

b. A(2,4) and B(-3,-2)

$$\begin{array}{ccc}
 x_1, y_1 & x_2, y_2 & \\
 \text{A}(2, 4) & \text{B}(-3, -2) & \\
 \end{array}
 \quad AB = \sqrt{(-3 - 2)^2 + (-2 - 4)^2}$$

$$\sqrt{5^2 + (-6)^2} = \sqrt{25 + 36} = \sqrt{61}$$

-5 · -5 = 25
 $(-3)^2 = -1 \cdot 5^2 = -25$

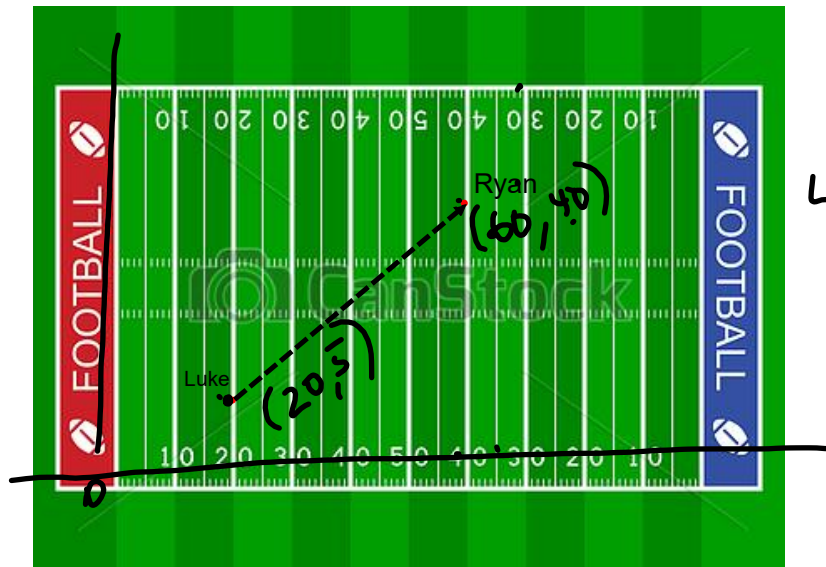
c. E(-5,6) and F(8,-4)

$$EF = \sqrt{(8 - (-5))^2 + (-4 - 6)^2}$$

$$\sqrt{13^2 + 10^2} = \sqrt{169 + 100} = \sqrt{269}$$

Real World Example. Football

Luke is standing on his team's 20 yard line, 5 yards from the sideline, when he throws the football. Ryan catches it on the other team's 40 yard line, 20 yards from the side line. How far did Luke throw the foot ball? Think of the field as the coordinate plane and have the end zone be zero.



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HW page 20 11-35
odd

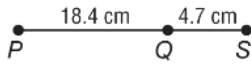
NAME _____ DATE _____ PERIOD _____

1-2 Practice

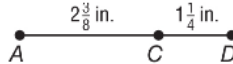
Line Segments and Distance

Find the measurement of each segment. Assume that each figure is not drawn to scale.

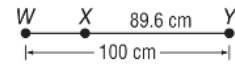
1. \overline{PS}



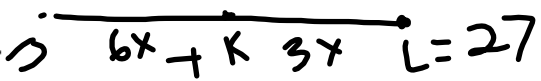
2. \overline{AD}



3. \overline{WX}



ALGEBRA Find the value of x and KL if K is between J and L .

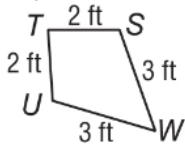


4. $JK = 6x$, $KL = 3x$, and $JL = 27$

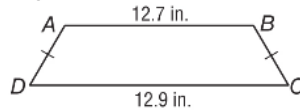
5. $JK = 2x$, $KL = x + 2$, and $JL = 5x - 10$

Determine whether each pair of segments is congruent.

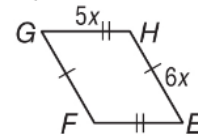
6. \overline{TU} , \overline{SW}



7. \overline{AD} , \overline{BC}



8. \overline{GF} , \overline{FE}



Use the number line.



9. Find ST .

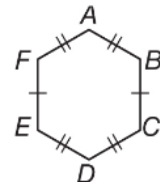
10. Find SV .

Find the distance between each pair of points.

11. $S(4, -3)$ and $T(-2, 2)$

12. $X(-3, -2)$ and $Y(-6, 5)$

13. **CARPENTRY** Jorge used the figure at the right to make a pattern for a mosaic he plans to inlay on a tabletop. Name all of the congruent segments in the figure.



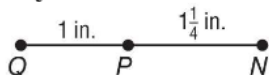
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1-2 Skills Practice

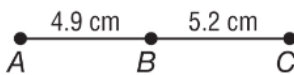
Line Segments and Distance

Find the measurement of each segment. Assume that each figure is not drawn to scale.

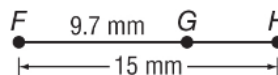
1. \overline{NQ}



2. \overline{AC}



3. \overline{GH}



ALGEBRA Find the value of x and YZ if Y is between X and Z .

4. $XY = 5x$, $YZ = x$, and $XZ = 25$

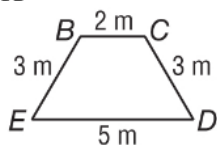
5. $XY = 12$, $YZ = 2x$, and $XZ = 28$

6. $XY = 4x$, $YZ = 3x$, and $XZ = 42$

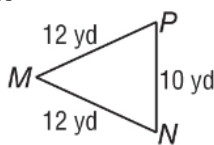
7. $XY = 2x + 1$, $YZ = 6x$, and $XZ = 81$

Determine whether each pair of segments is congruent.

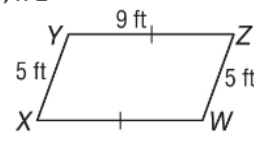
8. \overline{BE} , \overline{CD}



9. \overline{MP} , \overline{NP}



10. \overline{WX} , \overline{WZ}



Use the number line.



11. Find LN .

12. Find JL .

Find the distance between each pair of points.

13. $A(-3, 8)$ and $B(-1, 4)$

14. $M(4, -3)$ and $N(-2, 1)$