

Lesson 1.2: Distance and Midpoint

* Fill in postulates 2 and 4

Example 1

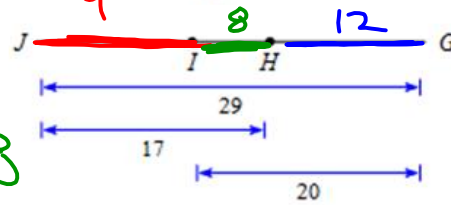
Using segment/angle addition postulate

a. Find the missing length.



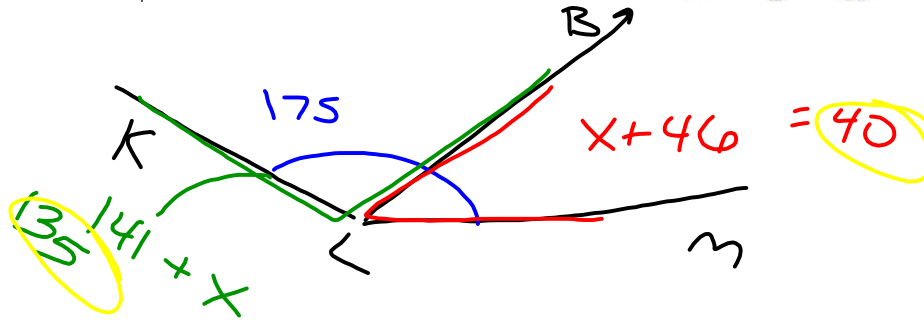
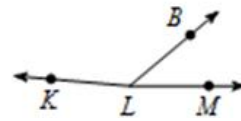
$$LK = 5$$

b. Find IH.



$$IH = 8$$

c. $m\angle KLM = 175^\circ$, $m\angle BLM = x + 46$,
and $m\angle KLB = 141 + x$. Find x .



$$\text{Blue} = \text{Red} + \text{Green}$$

$$175 = \underline{x + 46} + \underline{141 + x}$$

$$175 = 2x + 187$$

$$\underline{-187} \qquad \underline{-187}$$

$$\underline{-12} = \underline{2x}$$

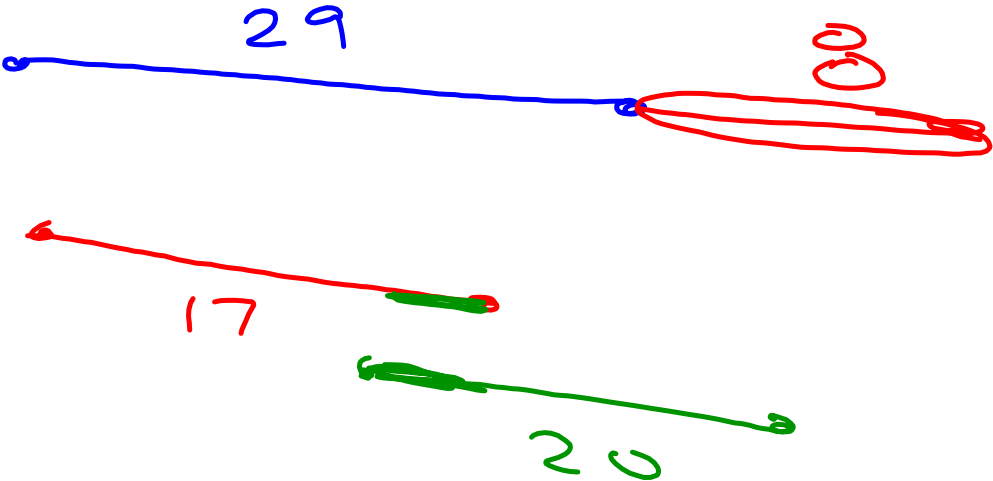
$$x = -6$$

Search Words:

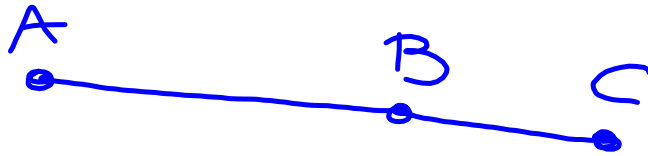
Midpoint formula

Finding endpoint given the midpoint

Distance formula

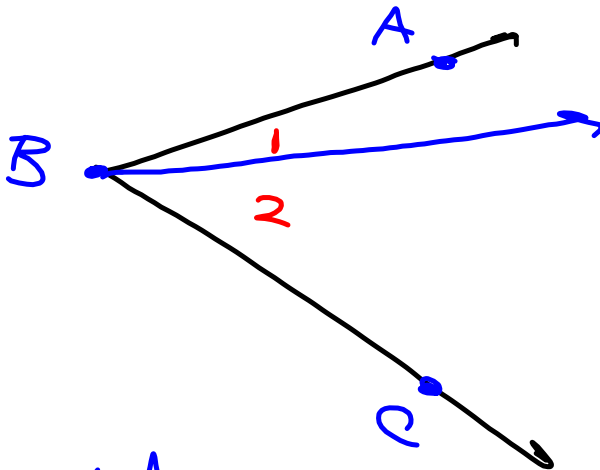


Postulate 2: Segment Addition Postulate



$$\overline{AC} = \overline{AB} + \overline{BC}$$

Postulate 4: Angle Addition Postulate



$$\angle ABC = \angle 1 + \angle 2$$

Midpoint: the point that cuts the line in half

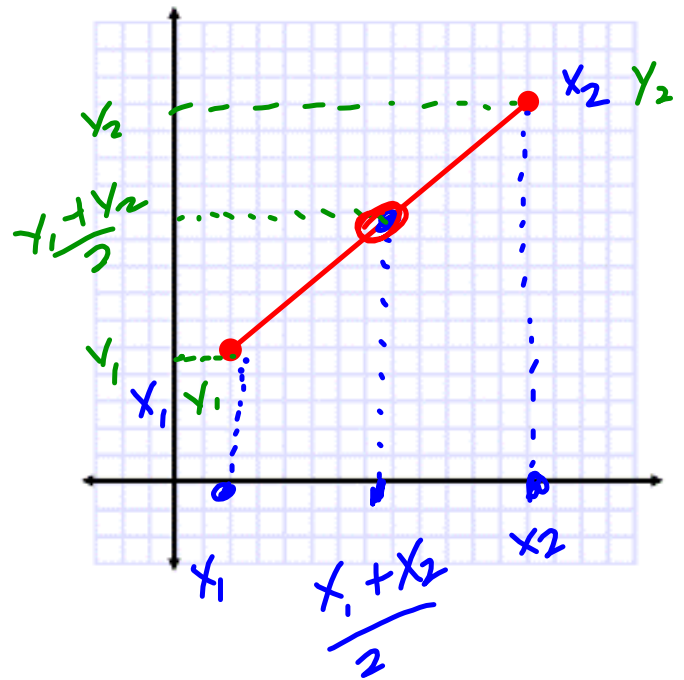


Segment Bisector: anything that cuts a line in half



Midpoint Formula:

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$



Example 2

Using midpoint formula

a. Find the midpoint.

$$(-4, 4), (-9, 0)$$

$$\frac{-4 + -9}{2}, \frac{4 + 0}{2}$$

$$\left(-\frac{13}{2}, 2\right)$$

c. Find the endpoint, given one endpoint and the midpoint

Endpoint: $(2, -3)$, midpoint: $(-10, 7)$

$$\underline{-10 \times 2} \quad 7 \times 2$$

$$\frac{x_1 + x_2}{2} = -10$$

$$\frac{y_1 + y_2}{2} = 7$$

$$\frac{2 + x_2}{2} = (-10) \quad 2 \left(\frac{-3 + y_2}{2}\right) = (7) \quad 2$$

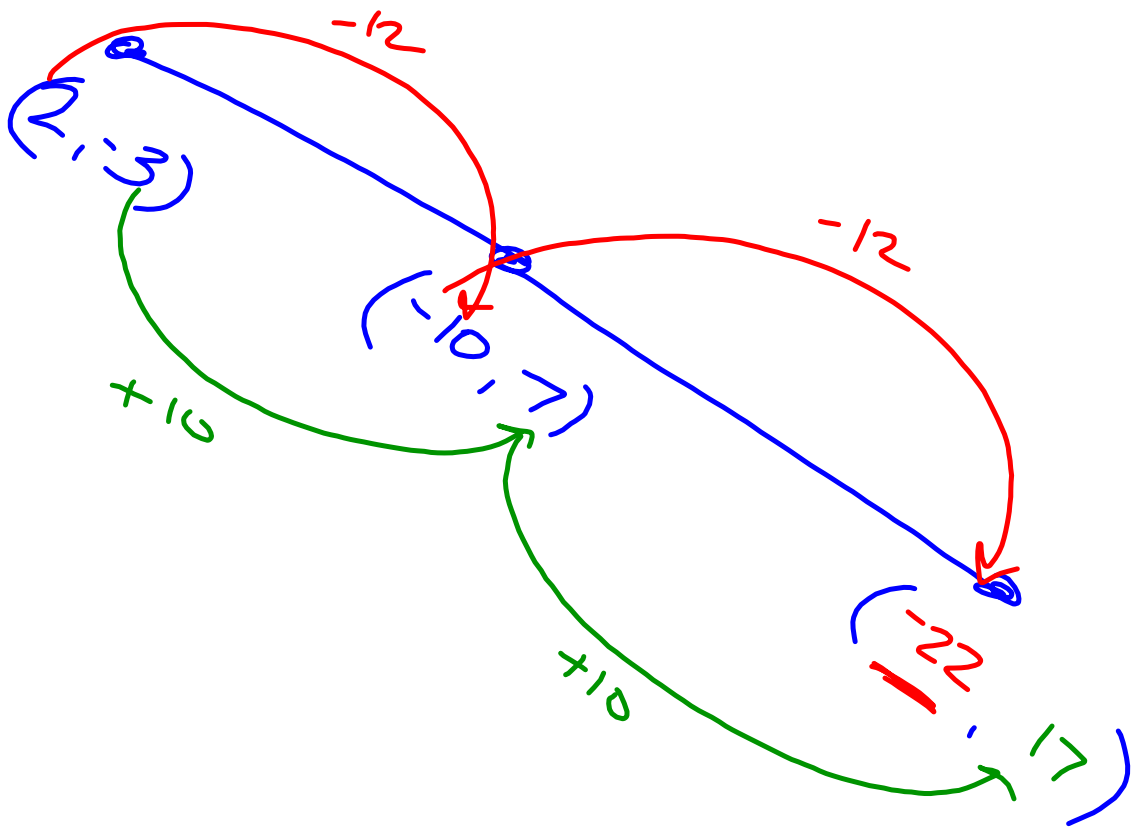
$$\begin{array}{r} -3 + y_2 = 14 \\ +3 \end{array}$$

$$\begin{array}{r} 2 + x_2 = -20 \\ -2 \end{array}$$

$$y_2 = 17$$

$$x_2 = -22$$

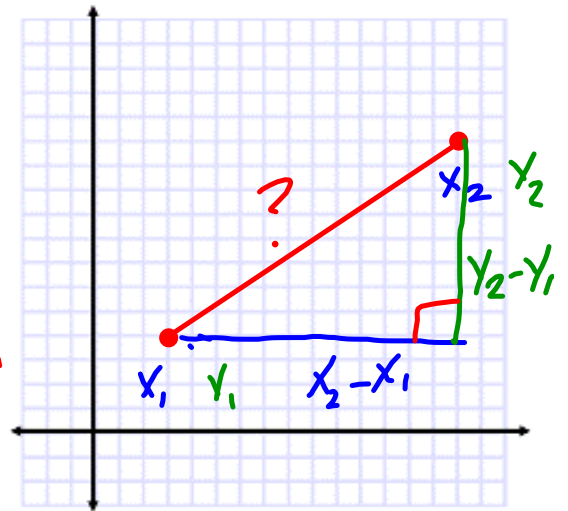
$$\boxed{(-22, 17)}$$



Distance Formula:

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

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



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

Example 3

Using distance formula

a. Find the distance. $(x_1, y_1), (x_2, y_2)$
 $(4, -8), (7, 6)$

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

$$\sqrt{(7 - 4)^2 + (6 - (-8))^2}$$

$$\sqrt{3^2 + 14^2}$$

$$\sqrt{9 + 196}$$

$$d = \sqrt{205}$$

