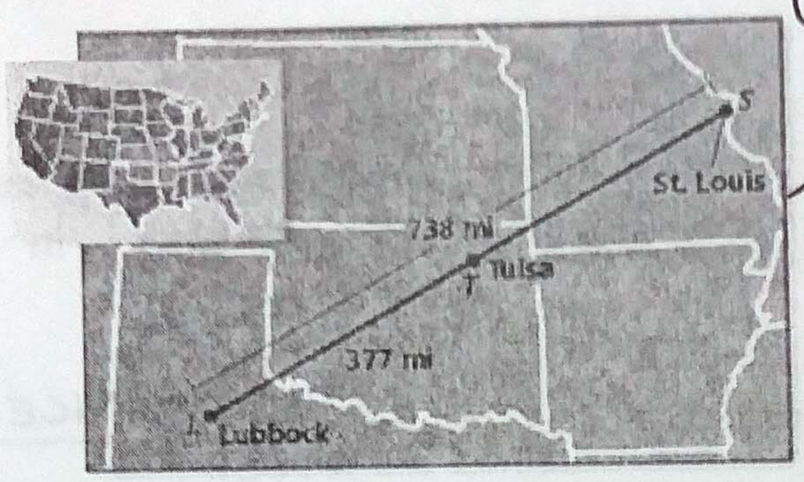
5. How far is Tulsa from St. Louis?



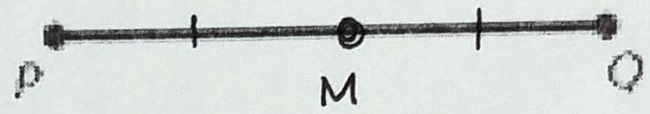
LS = 738 MILES
LT = 377 MILES
TS = ?

LS = LT + TS
738 = 377 + TS
361 = TS

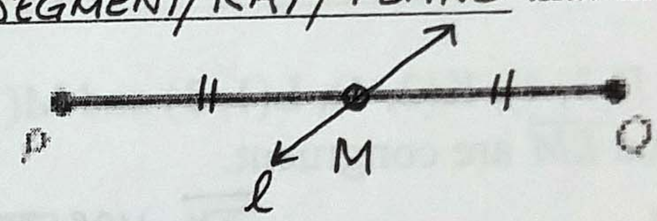
TULSA IS 361 MILES FROM ST. LOUIS.

Midpoints and Segment Bisectors

Midpoint: The midpoint of a segment is the point that divides the segment into 2 ≅ SEGMENTS.

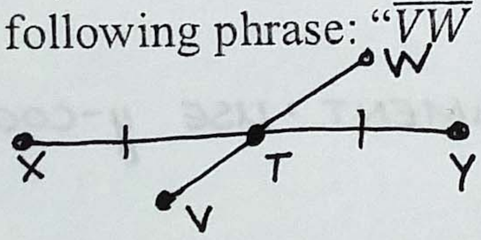


Segment Bisector: A segment bisector is a POINT/LINE/LINE SEGMENT/RAY/PLANE that intersects the segment at its MIDPOINT.

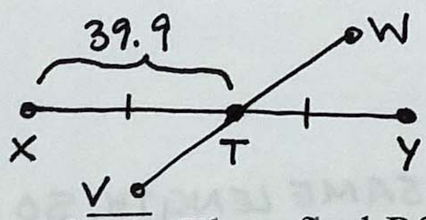


Examples:

1. Make a sketch of the following phrase: "$\overline{VW}$ bisects $\overline{XY}$ at point T."

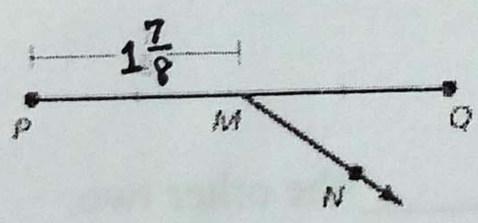


2. XT = 39.9 cm XY = ?



XY = XT + TY
XY = 39.9 + 39.9
XY = 79.8 cm

3. Identify the segment bisector of $\overline{PQ}$. Then find PQ.



SEGMENT BISECTOR: $\overrightarrow{MN}$

PQ = PM + MQ
PQ = $1\frac{7}{8} + 1\frac{7}{8}$
PQ = $3\frac{3}{4}$ OR $\frac{15}{4}$ OR 3.75

Using Algebra with Segment Lengths

Example: 4. Point M is the midpoint of $\overline{VW}$. Find the length of $\overline{VM}$.

VM = MW
4x − 1 = 3x + 3
x − 1 = 3
x = 4

VM = 4x − 1
VM = 4(4) − 1
VM = 15

Using the Midpoint Formula

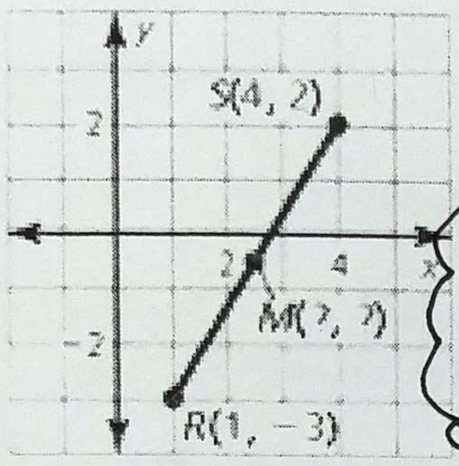
The Midpoint Formula: The coordinates of the midpoint of a segment are the AVERAGE of the x-coordinates and the AVERAGE of the y-coordinates of the endpoints.

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

(x_m, y_m)

Examples:

5. The endpoints of $\overline{RS}$ are shown in the diagram. Find the coordinates of the midpoint M.



R(1,-3)
x_1 y_1

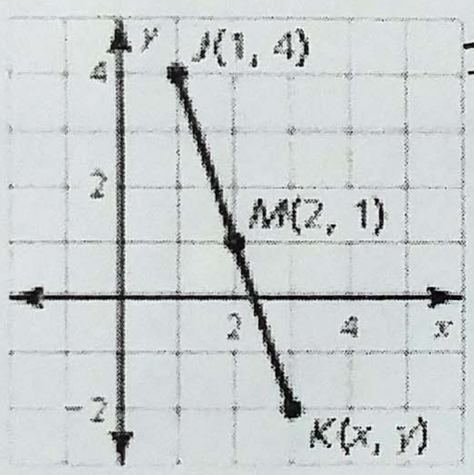
S(4,2)
x_2 y_2

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

$$= \left(\frac{1+4}{2}, \frac{-3+2}{2}\right)$$

$$= \boxed{\left(\frac{5}{2}, \frac{-1}{2}\right) \text{ OR } (2.5, -0.5)}$$

6. The midpoint of $\overline{JK}$ and endpoint J are given. Find the coordinates of the other endpoint, K.



J(1,4)
x_1 y_1

M(2,1)
x_m y_m

K(?,?)
x_2 y_2

$$\overset{M}{(x_m, y_m)} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

$$(2,1) = \left(\frac{1+x_2}{2}, \frac{4+y_2}{2}\right)$$

$2 = \frac{1+x_2}{2}$ $\quad$ $1 = \frac{4+y_2}{2}$

$4 = 1 + x_2$ $\quad$ $2 = 4 + y_2$

$3 = x_2$ $\quad$ $-2 = y_2$

$\boxed{K(3,-2)}$

The Distance Formula: If A(_____ , _____) and B(_____ , _____) are points in the coordinate plane, then the distance between A and B is:

Example: 7. Find the distance between R(2, 3) and S(4, -1). Make a sketch on the coordinate plane provided.