Chapter 1 Section 3 - Notes

Name Key

Date Due _____

Period _____

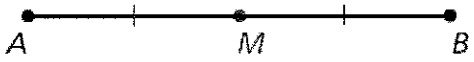
Using Midpoint Formulas

Vocabulary:

Midpoint

- the point that divides the segment into two congruent segments

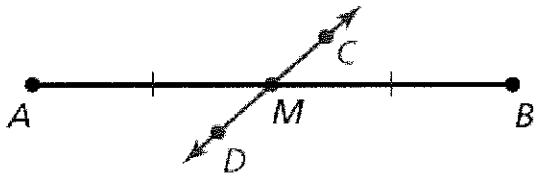
$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$



M is the midpoint of $\overline{AB}$.
So, $\overline{AM} \cong \overline{MB}$ and $AM = MB$.

Segment bisector

- a point, ray, line, line segment, or plane that intersects the segment at its midpoint
- a midpoint or a segment bisector **bisects** a segment



$\overleftrightarrow{CD}$ is a segment bisector of $\overline{AB}$.
So, $\overline{AM} \cong \overline{MB}$ and $AM = MB$.

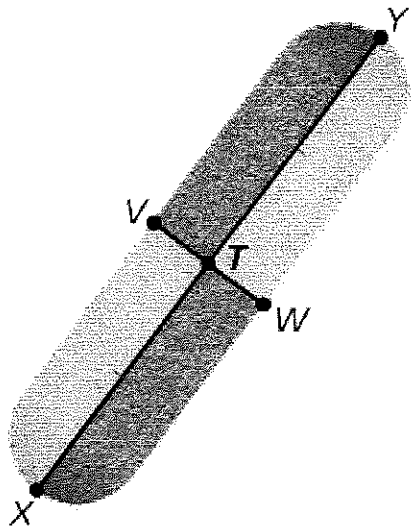
Example 1: Finding Segment Lengths

In the skateboard design, $\overline{VW}$ bisects $\overline{XY}$ at point T, and XT = 39.9 cm. Find XY

XY = 79.8cm

$XY = 2(39.9)$

$= \boxed{79.8}$



Chapter 1 Section 3 - Notes

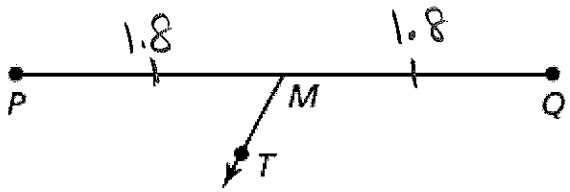
Name _____

Date Due _____

Period _____

Example 2:

$\overrightarrow{MT}$ bisects $\overline{PQ}$ at point M, and PM = 1.8 mm. Find PQ



PQ = 3.6mm

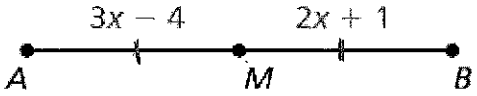
$PQ = 2(1.8)$

$= \boxed{3.6}$

Example 3:

Point M is the midpoint of $\overline{AB}$. Find the length of AB. Show all work.

AB = 22



$3x - 4 = 2x + 1$

$\boxed{x = 5}$

$AB = 3x - 4 + 2x + 1$

$= 5x - 3$

$= 5(5) - 3$

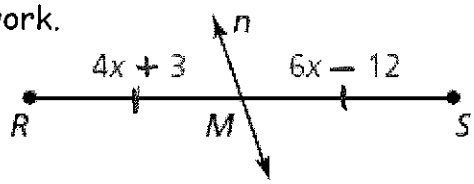
$= \boxed{22}$

Example 4:

Identify the segment bisector of $\overline{RS}$. Then find RS. Show all work.

Segment Bisector = line n

RS = 66



$4x + 3 = 6x - 12$

$15 = 2x$

$\boxed{7.5 = x}$

$RS = 4x + 3 + 6x - 12$

$= 4(7.5) + 3 + 6(7.5) - 12$

$= \boxed{66}$

Chapter 1 Section 3 - Notes

Name _____

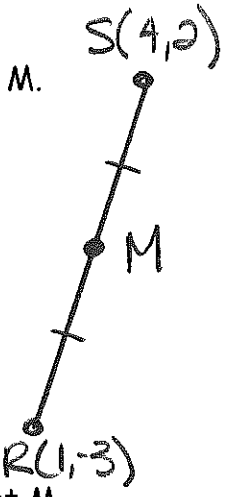
Date Due _____

Period _____

Example 5: Finding the Midpoint

The endpoints of $\overline{RS}$ are R(1, -3) and S(4, 2). Find the coordinates of the midpoint M.

Draw and label the diagram. Show all work.



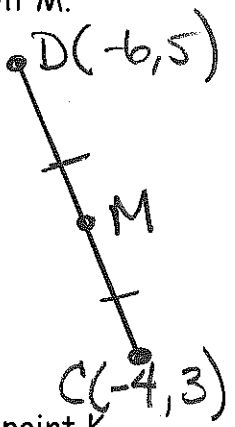
M = $(5/2, -1/2)$

midpoint = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ = $\left(\frac{1+4}{2}, \frac{-3+2}{2}\right)$ = $\left(\frac{5}{2}, \frac{-1}{2}\right)$

Example 6:

The endpoints of $\overline{CD}$ are C(-4, 3) and D(-6, 5). Find the coordinates of the midpoint M.

Draw and label the diagram. Show all work.



M = $(-5, 4)$

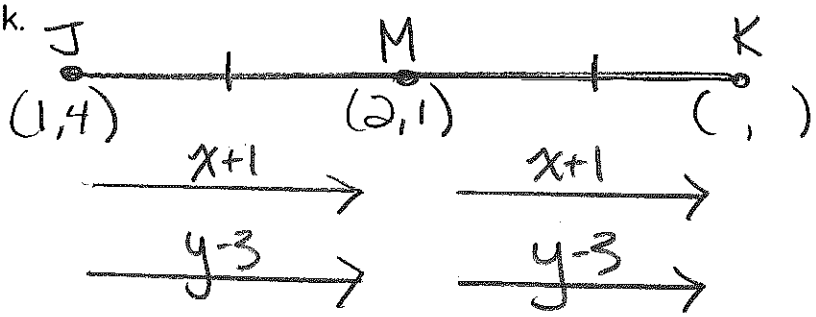
midpoint = $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$ = $\left(\frac{-4+-6}{2}, \frac{3+5}{2}\right)$ = $\left(\frac{-10}{2}, \frac{8}{2}\right)$ = $(-5, 4)$

Example 7:

The midpoint of $\overline{JK}$ is M(2, 1). One endpoint is J(1, 4). Find the coordinates of endpoint K.

Draw and label the diagram. Show all work.

K = $(3, -2)$

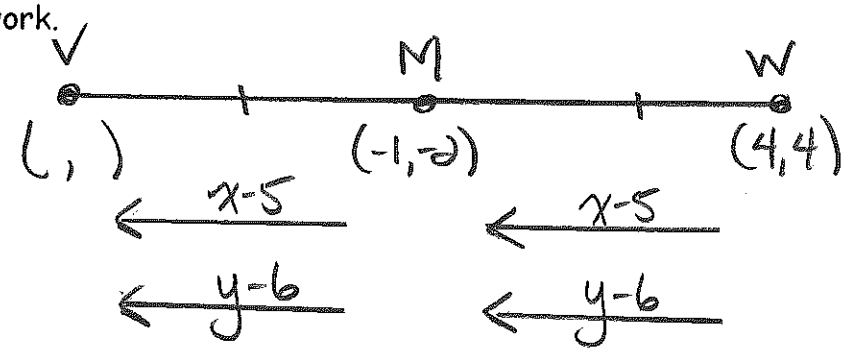


Example 8:

The midpoint of $\overline{VW}$ is M(-1, -2). One endpoint is W(4, 4). Find the coordinates of endpoint V.

Draw and label the diagram. Show all work.

V = $(-6, -8)$



Chapter 1 Section 3 - Notes

Name _____

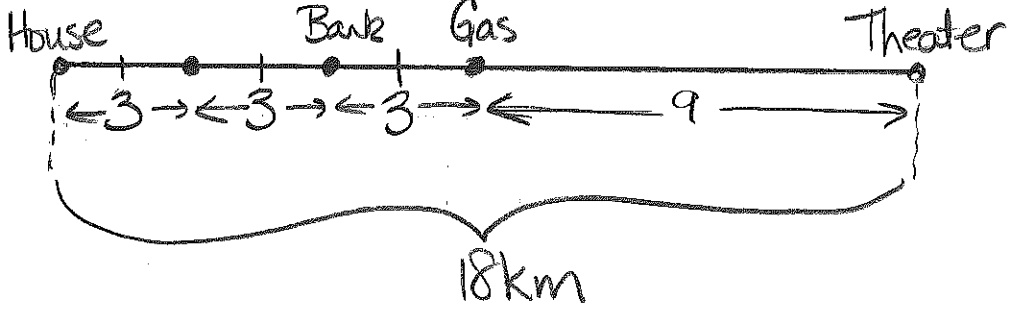
Date Due _____

Period _____

Example 9:

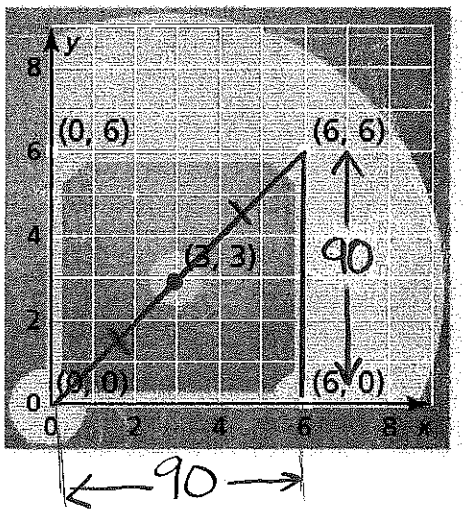
Your house and the theater are 18 kilometers apart on the same straight road. You need to stop at the bank so you can get gas on the way to the theater. The gas station is halfway between your house and the theater. The bank is 2/3 of the way to the gas station. Draw a sketch to represent this situation. Mark the locations of your house, the bank, the gas station, and the theater. How far is the bank from your house?

Distance = 6 km



Example 10:

The figure shows a coordinate plane on a baseball field. The distance from home plate to first base is 90 feet. The pitching mound is the midpoint between home plate and second base. Find each measure. Show all work.



a. The distance from home plate to second base

Distance = 127.3 ft

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

$90^2+90^2=c^2$

$16200=c^2$

$127.27=c$

b. The distance between home plate and the pitching mound

Distance = 63.7 ft

$\frac{127.3}{2} = 63.65$

c. The coordinates of the midpoint between the pitching mound and second base

Coordinates = $(9/2, 9/2)$

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

$\left(\frac{3+6}{2}, \frac{3+6}{2}\right)$

$\left(\frac{9}{2}, \frac{9}{2}\right)$