Math-2
Lesson 7-1

Geometry Review,
and
Midpoint Formula
and
Distance Formula

What is: ? Geometry

Describe…

Point

Line

Line Segment

Length of a line segment

Ray

Angle

What are the symbols for

Point

Line:

Line Segment

Length of a line segment

Ray

Angle

What is a…?

Right Angle

Acute Angle

Obtuse Angle

Straight Angle

Theta “Ɵ”

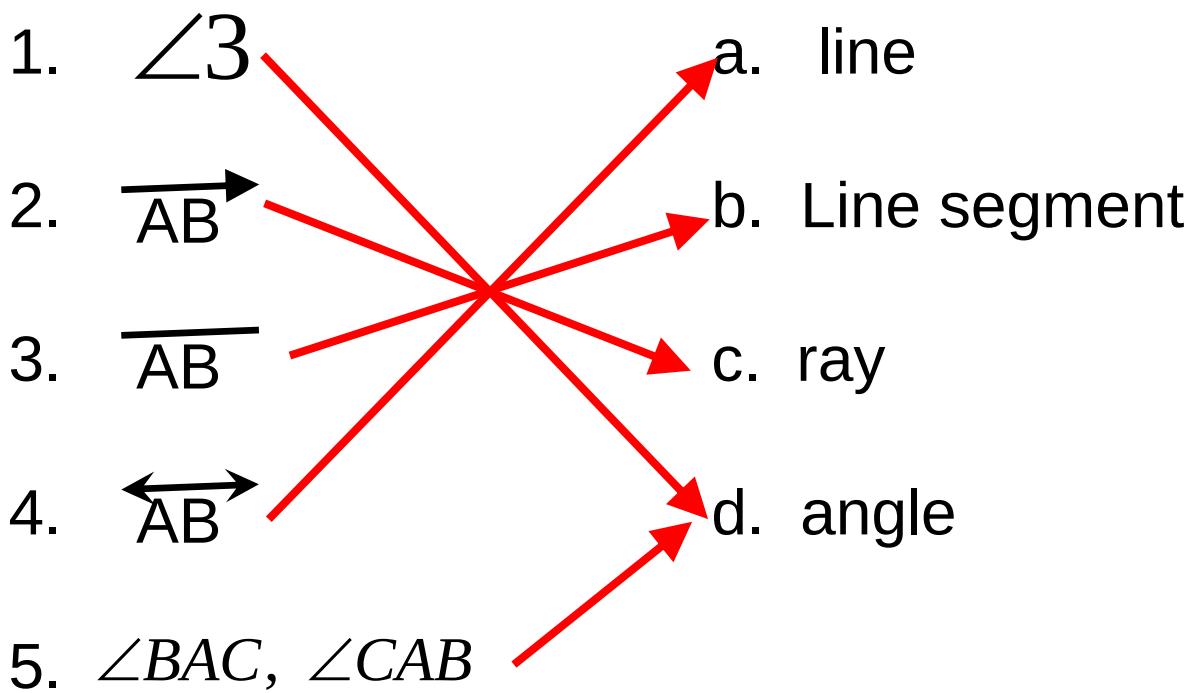
Number line

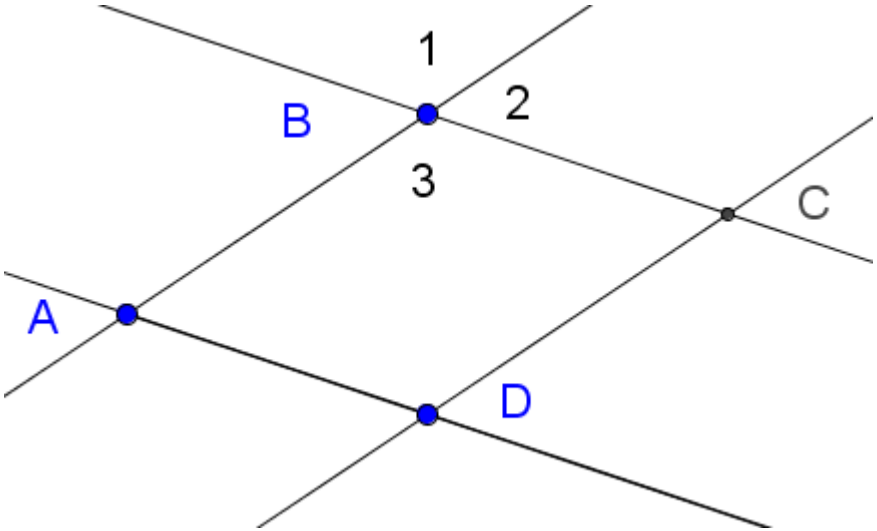
x-y Plane

Colinear points

midpoint

Match the symbol with its description





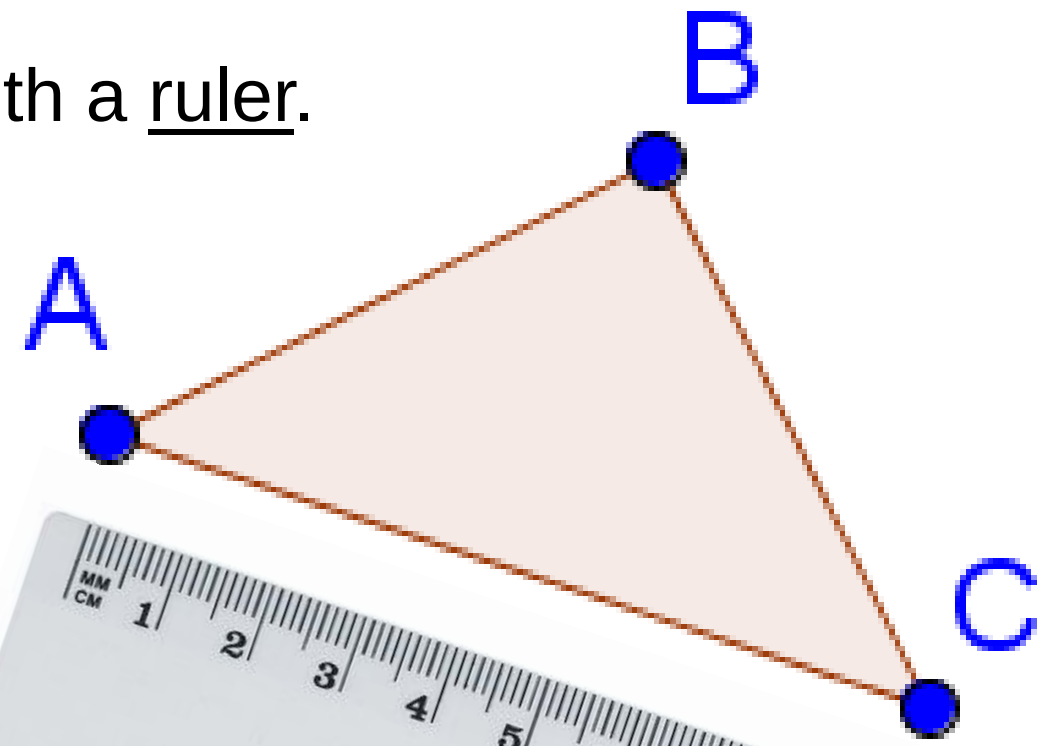
(1) Can $\angle 3$ be named $\angle B$? If not, why can't it be? No because we don't know which angle it is if we just say $\angle B$.

(2) Represent $\angle 3$ two other ways. $\angle ABC$

$\angle CBA$

How are the lengths of segments measured?

With a ruler.



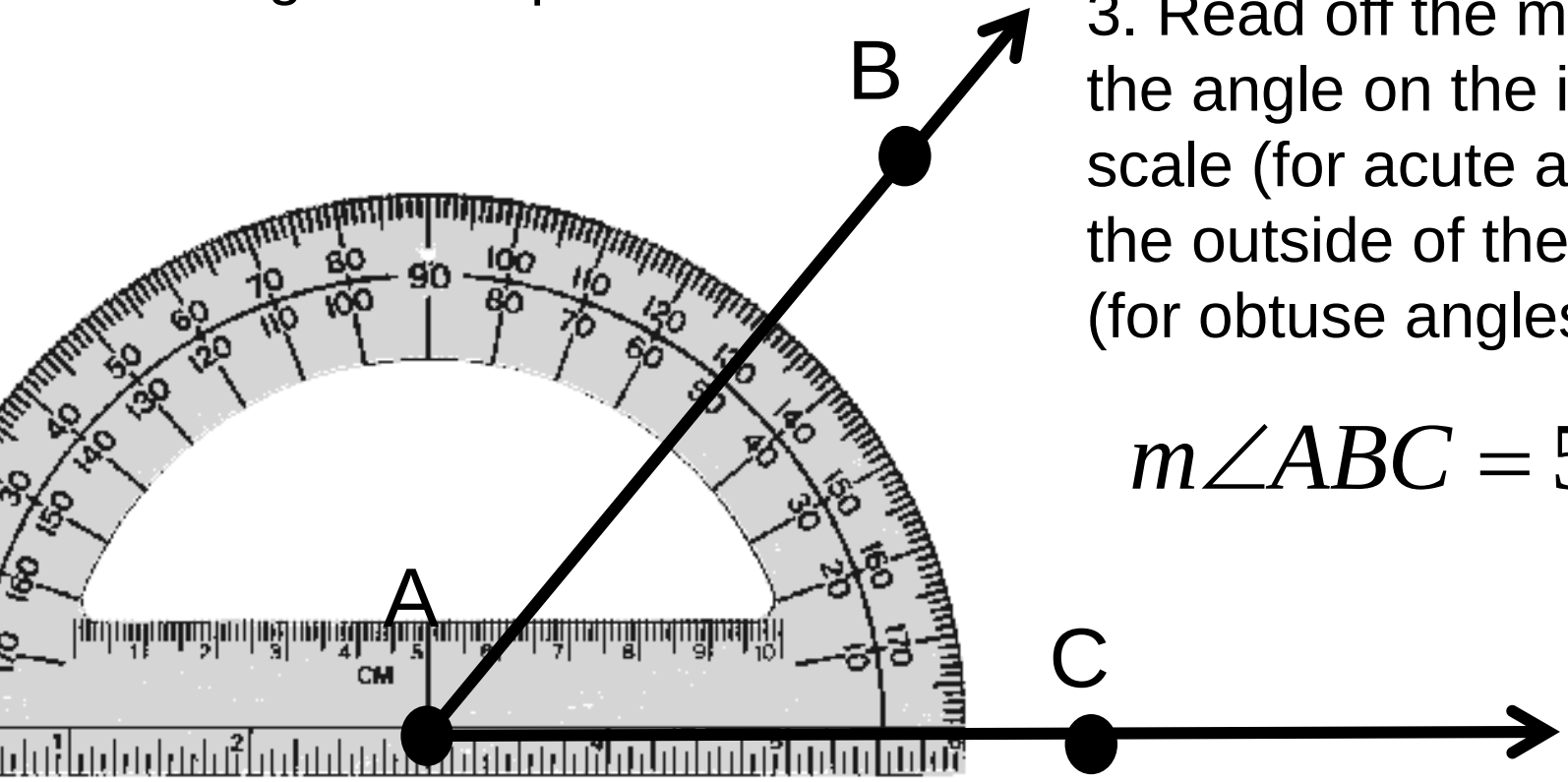
AC = ?

AC = 9 cm

How are angles measured? With a protractor

1. Put the hole of the protractor at the vertex of the angle.

2. Line up one side of the angle so that it goes through “0” on the edge of the protractor.

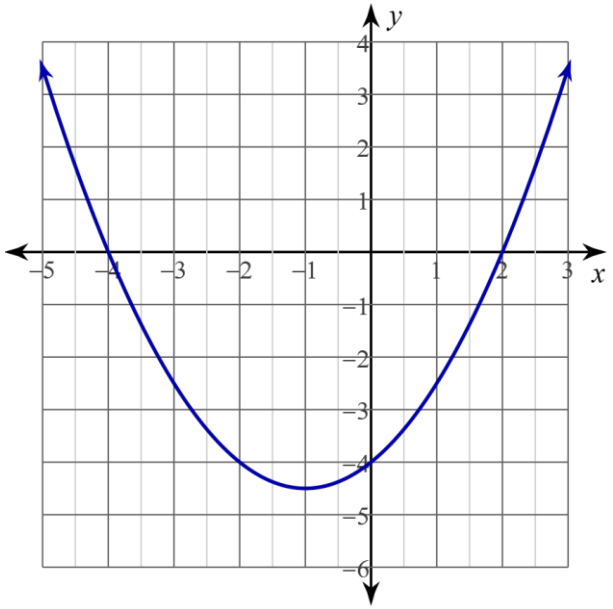


3. Read off the measure of the angle on the inside scale (for acute angles) or the outside of the scale (for obtuse angles).

$$m\angle ABC = 50^\circ$$

We can find the midpoint between any two numbers on a number line by ***averaging*** them. $\frac{a+b}{2}$

How do you convert an intercept form quadratic equation into a vertex form quadratic equation?



$$\frac{(-4)+(2)}{2} = \frac{-2}{2} = -1$$

For the parabola, what special point has an x-coordinate that is the midpoint between the two x-intercepts?

vertex

We can find the midpoint of a segment that is on the (x, y) plane using the following formula:

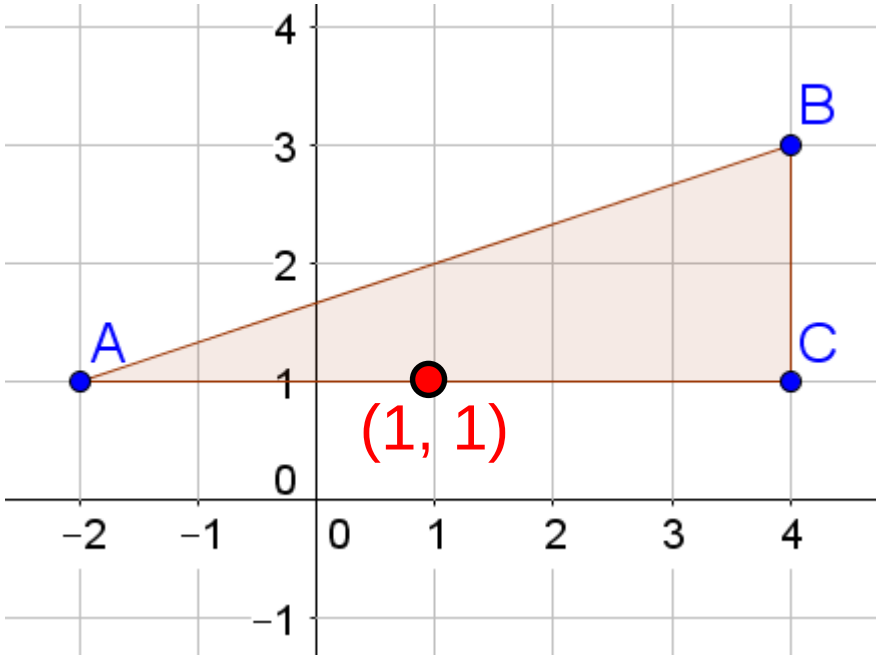
$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

The midpoint x-coordinate is the average of the x-coordinates of the two end points.

The midpoint y-coordinate is the average of the y-coordinates of the two endpoints.

Does the order of x_1 and x_2 matter?

Why not? Commutative property of addition.



Midpoint of $\overline{AC}$ = ?

Point A : $(x_1, y_1) = (-2,1)$

Point C : $(x_2, y_2) = (4,1)$

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

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

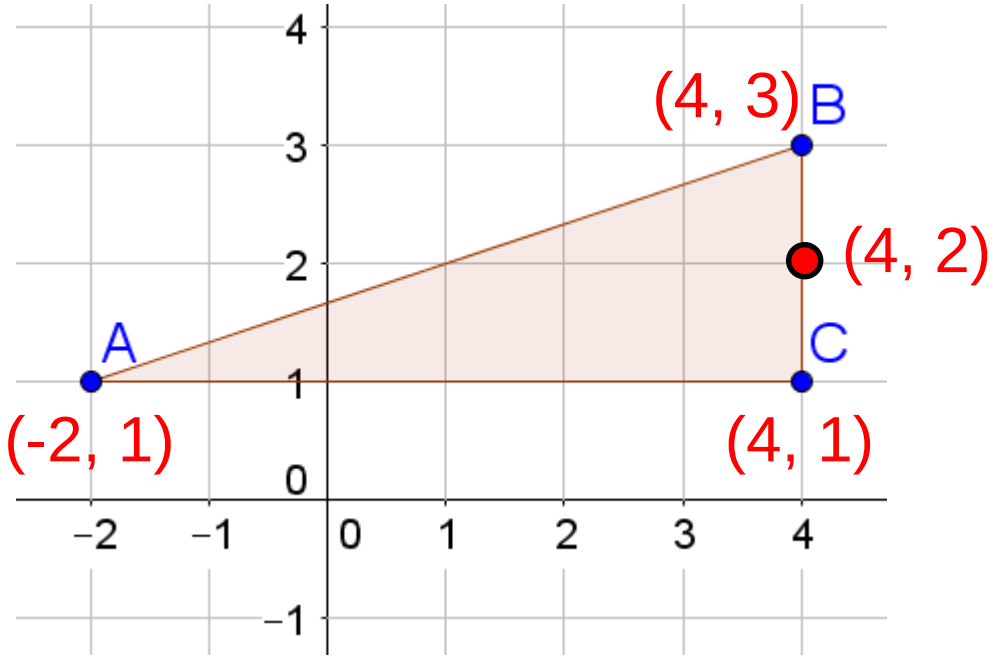
$$(1,\ 1)$$

Midpoint$_{\overline{AC}}$: $(1,\ 1)$

Is it necessary to use the midpoint formula to calculate the y-value of a midpoint on a horizontal line?

Why not?

Y-values are all the same on a horizontal line.



Is it necessary to use the midpoint formula to calculate the x-value of a midpoint on a vertical line?

Why not?

x-values are all the same on a vertical line.

Midpoint of $\overline{BC}$ = ?

$$\text{Point B}: (x_1, y_1) = (4,3)$$

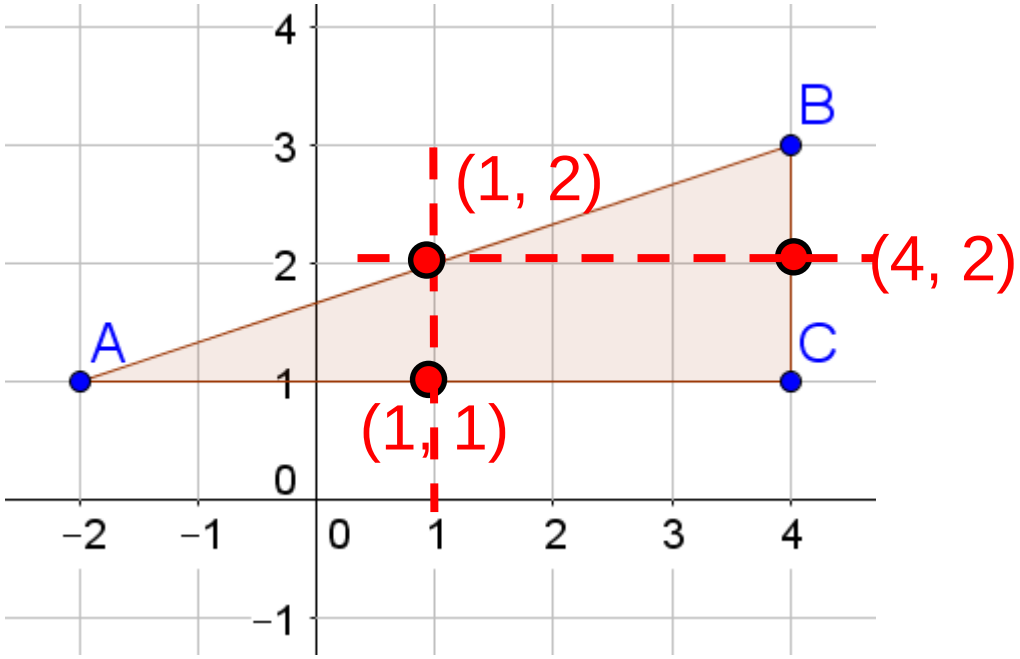
$$\text{Point C}: (x_2, y_2) = (4,1)$$

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

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

$$(4,\ 2)$$

$$\text{Midpoint}_{\overline{BC}}: (4,\ 2)$$



Midpoint of $\overline{AB}$ = ?

Point A : $(x_1, y_1) = (-2,1)$

Point B : $(x_2, y_2) = (4,3)$

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

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

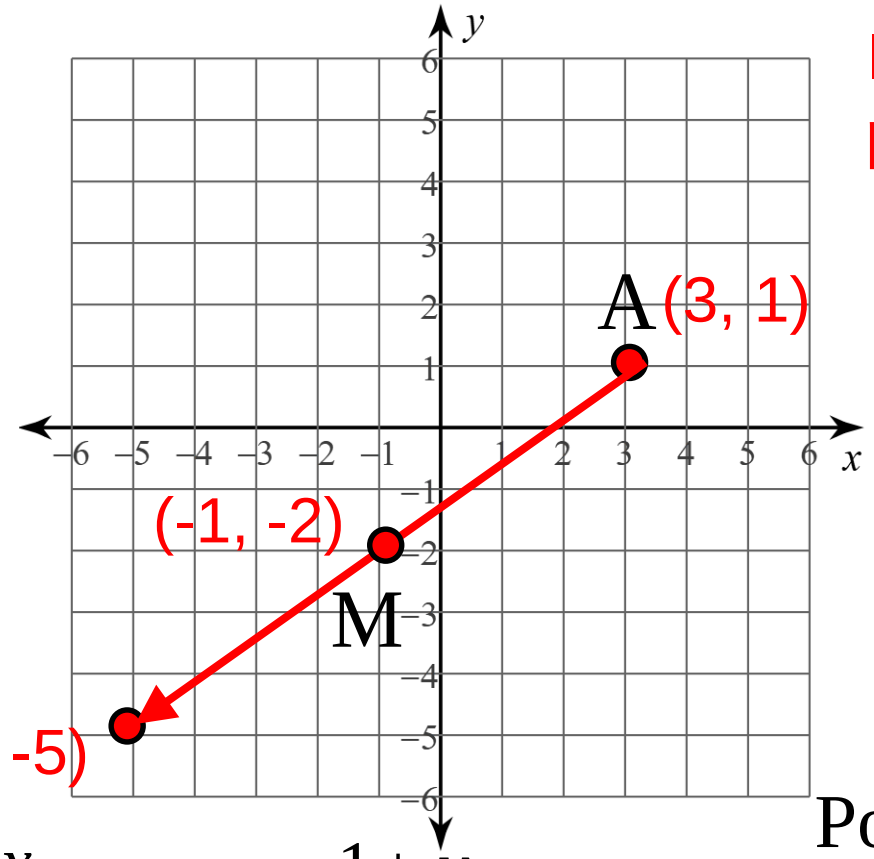
$$\text{Midpoint}_{\overline{AB}} : (1,\ 2)$$

Is it necessary to use the midpoint formula to calculate the x-value and y-value of a midpoint on a line that is neither horizontal or vertcal?

Why?

Every x-y pair is unique on this type of line.

Midpoint of $\overline{AB}$ is (-1,-2) Point A is (3,1). What is Point B?



In which quadrant of the x-y plane is point B?

$$\text{Midpoint}_{\overline{AB}} : (-1, -2)$$

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

$$\frac{x_1 + x_2}{2} = -1 \qquad \frac{y_1 + y_2}{2} = -2$$

$$\text{Point A} : (x_1, y_1) = (3, 1)$$

$$\frac{3 + x_2}{2} = -1 \qquad \frac{1 + y_2}{2} = -2$$

$$3 + x_2 = -2 \qquad 1 + y_2 = -4$$

$$x_2 = -5 \qquad y_2 = -5$$

Find the midpoint between (2, 5) and (-4, 15) $\rightarrow (-1, 10)$

$$= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \rightarrow \left(\frac{-4 + 2}{2}, \frac{15 + 5}{2}\right) \rightarrow \left(\frac{-2}{2}, \frac{20}{2}\right)$$

Find the midpoint between (-3, -6) and (6, -11) $\rightarrow (-1, 10)$

$$\rightarrow \left(\frac{-3 + 6}{2}, \frac{-6 + (-11)}{2}\right) \rightarrow \left(\frac{3}{2}, \frac{-17}{2}\right)$$

Find the midpoint of segment AB is (4, -2) and one endpoint is (11, -5). What is the other endpoint?

$$\left(\frac{x_1 + 11}{2}, \frac{y_1 - 5}{2}\right) = (4, -2)$$

$$\frac{x_1 + 11}{2} = 4 \quad x_1 = -3 \qquad \frac{y_1 - 5}{2} = -2 \quad y_1 = 1$$