SM2 HANDOUT 7-1 (Geometry and the Midpoint Formula)

Describe…	What are the symbols for
Point	Point
Line	Line:
Line Segment	Line Segment
Length of a line segment	Length of a line segment
Ray	Ray
Angle	Angle

Geometry

What is a…?

Right Angle

Acute Angle

Obtuse Angle

Straight Angle

Theta "Θ"

Number line

x-y Plane

Colinear points

midpoint

Match the symbol with its description

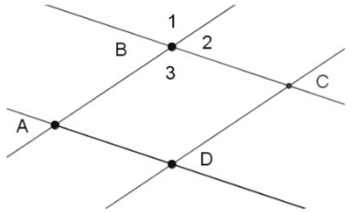
1. $\angle 3$
2. $\overrightarrow{AB}$
3. $\overline{AB}$
4. $\overleftrightarrow{AB}$
5. $\angle BAC,\ \angle CAB$

a. line

b. Line segment

c. ray

d. angle

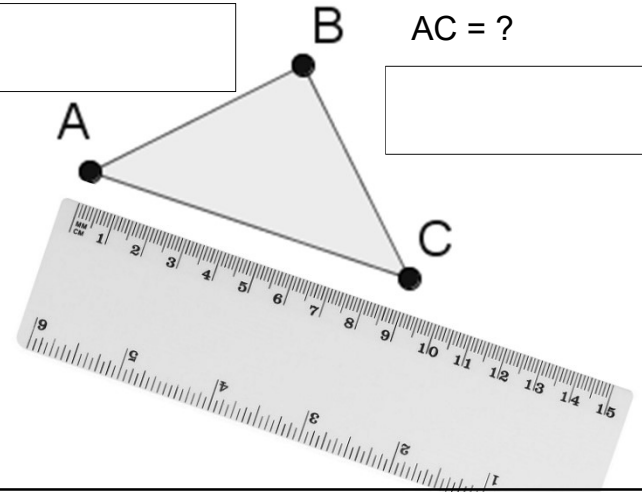


(1) Can $\angle 3$ be named $\angle B$? If not, why can't it be?

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

How are the lengths of segments measured?

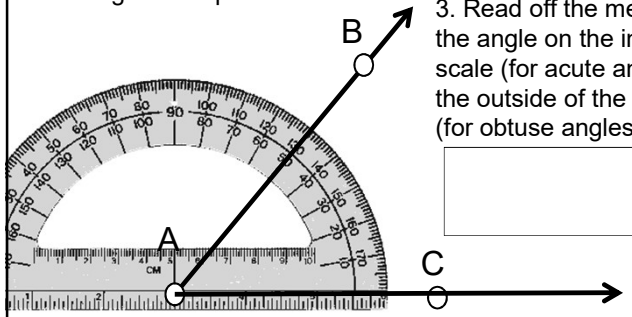
AC = ?



How are angles measured? With a protractor

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

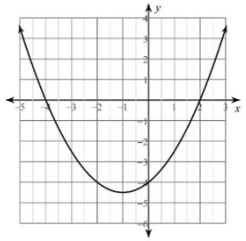
2. Line up one side of the angle so that it goes through "0" on the edge of the protractor.



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

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:

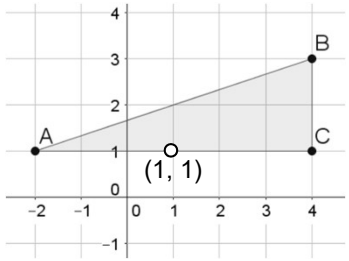
$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

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

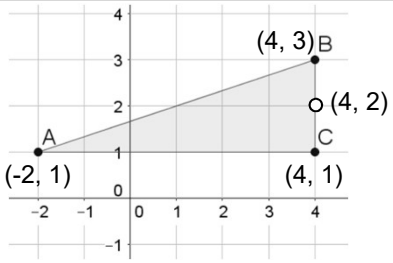
Point C: $(x_2, y_2) = (4,1)$

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

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.



Midpoint of $\overline{BC}$ = ?

Point B : $(x_1, y_1) = (4,3)$

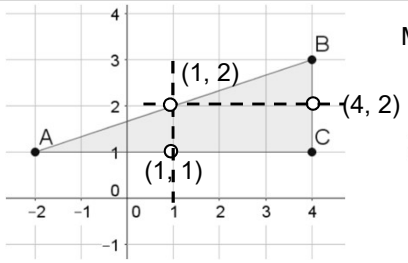
Point C : $(x_2, y_2) = (4,1)$

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

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 $\overline{AB}$ = ?

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

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

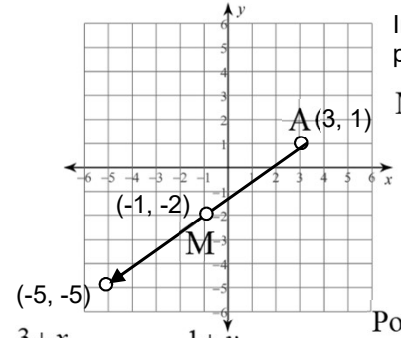
$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

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 vertical?

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?

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

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

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

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)

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

Find the midpoint between (-3, -6) and (6, -11)

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

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