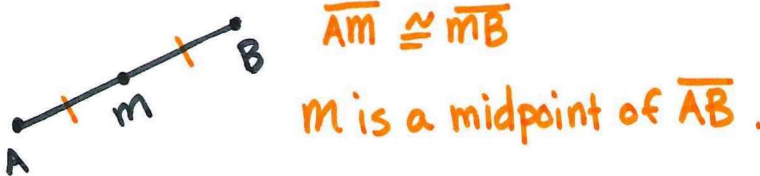
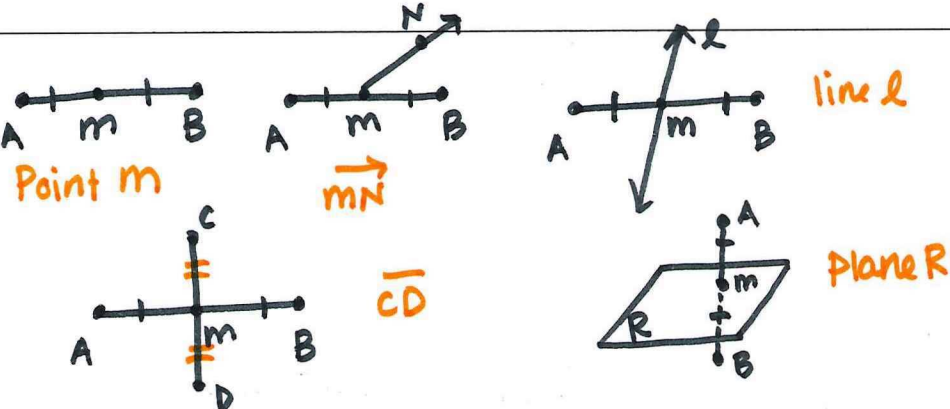


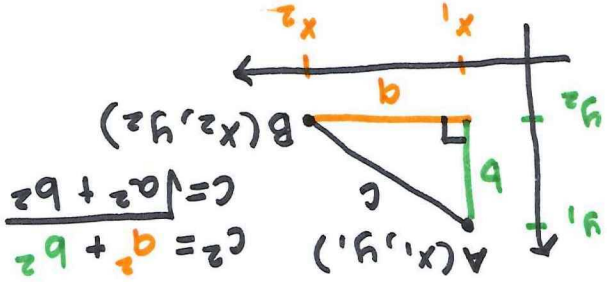
## USE MIDPOINT and DISTANCE FORMULA

Vocabulary	Definition	Example
<p>MIDPOINT MP</p>	<p>The point that <u>divides the segment into two congruent segments.</u></p>	
<p>SEGMENT BISECTOR</p>	<p>A point, ray, line, line segment, or plane that <u>intersects the segment at its midpoint.</u></p>	
<p>MIDPOINT FORMULA</p>	<p>The coordinates of a midpoint of a segment are the averages of the x-coordinates and the y-coordinates of the endpoints.</p> <p>If <math>A(x_1, y_1)</math> and <math>B(x_2, y_2)</math> are points on a coordinate plane, then the midpoint <math>M</math> has coordinates</p> $M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ <p style="text-align: center;"><math>m(x, y)</math></p>	<p><math>A(2, 7)</math> and <math>B(-6, 5)</math>. Find the midpoint.</p> <p style="margin-left: 40px;"><math>x_1, y_1</math>                      <math>x_2, y_2</math></p> $M\left(\frac{2 + (-6)}{2}, \frac{7 + 5}{2}\right)$ $M\left(\frac{-4}{2}, \frac{12}{2}\right)$ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <math>M(-2, 6)</math> </div>

DISTANCE  
FORMULA  
 $d = \text{distance}$

If  $A(x_1, y_1)$  and  $B(x_2, y_2)$  are points in a coordinate plane, then the distance between A and B is

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



Examples: Find the missing endpoint.  
The midpoint of  $\overline{AB}$  is  $M(-1, 12)$ . Find one endpoint is  $A(4, -2)$ . Find the coordinates of endpoint B.

$$\begin{array}{l} A(4, -2) \\ \hline M(-1, 12) \\ \hline B(-6, 26) \end{array}$$

$A(x_1, y_1)$  and  $B(x_2, y_2)$ . Find AB.

$$AB = \sqrt{(7-3)^2 + (1+8)^2}$$

$$AB = \sqrt{(4)^2 + (9)^2}$$

$$AB = \sqrt{16+81}$$

$$AB = \sqrt{97}$$