**Unit 4 #1 MIDPOINT & DISTANCE FORMULA**

CRITICAL THINKING STRING – WORK SPACE

**THE MIDPOINT FORMULA**A line segment’s midpoint is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the segment’s endpoints. The midpoint formula describes the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a line segment joining *A*(x1, y1) and *B*(x2, y2) as follows:
*M* = $\left(\frac{ }{2}, \frac{ }{2}\right)$

In words, each coordinate of *M* is the \_\_\_\_\_\_\_\_\_\_\_\_ of the corresponding coordinates of *A* and *B*.

Example 3: *Find the midpoint of a line segment.* Example 4: *Find an endpoint given an endpoint and*

Find the midpoint of the line segment joining (-6, 5) and (2, -3). *the midpoint.*

Let (x1, y1) = (\_\_\_\_, \_\_\_\_) and (x2, y2) = (\_\_\_\_, \_\_\_\_). Given endpoint A(-4, 1) and midpoint B(-1, 2). Find

 the coordinates for endpoint C.

--Write an equation using the given endpoint and midpoint.

--Set up two equations, one for the x-coordinate and one for the y-coordinate.

PRACTICE PROBLEMS

3. Find the midpoint of the line segment joining 4. Find endpoint C given endpoint A(-5, 6) and

 (-6, 5) and (1, 1). midpoint B(3, 2)

**THE DISTANCE FORMULA**The distance *d* between (x1, y1) and (x2, y2) is
*d* = $\sqrt{(\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}+ (\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}}$

Example 1: *Find the distance between two points*
Find the distance between (-5, -3) and (3, 6).

Let (x1, y1) = (\_\_\_\_, \_\_\_\_) and (x2, y2) = (\_\_\_\_, \_\_\_\_).

Example 2: *Classify a triangle using the distance formula.*

Classify *ABC* as scalene, isosceles, or equilateral.

*AB* = $\sqrt{(\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}+ (\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}}$

*BC* = $\sqrt{(\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}+ (\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}}$

**REMEMBER!**

Scalene 🡪 \_\_\_\_\_\_ sides equal

Isosceles 🡪 \_\_\_\_\_\_ sides equal

Equilateral 🡪 \_\_\_\_\_\_ sides equal

*AC* = $\sqrt{(\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}+ (\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_\\_)^{2}}$

*ABC* is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

PRACTICE PROBLEMS

1. Find the distance between (-7, 3) and (5, -2). 2. The vertices of a triangle are *T*(2, 1), *U*(4, 6), and *V*(7,3).

 Classify *TUV* as scalene, isosceles, or equilateral.