**Activity 2.3.1 Triangles in the Coordinate Plane**

You can use the coordinates of the vertices of triangles and the *distance formula* to classify triangles according to their sides. Write the name of each triangle with the discovered information of their side lengths and angle measures. Use the angles, sides or both to name the triangles.

**Here are some formulas you may want to recall:**

Distance formula = $\sqrt{\left(x\_{2}-x\_{1}\right)^{2}+\left(y\_{2}-y\_{1}\right)^{2}}$ Slope formula = $\frac{\left(y\_{2}-y\_{1}\right)}{\left(x\_{2-}x\_{1}\right)}$

Slopes of perpendicular lines are the inverse reciprocal of each other. For example lines with slopes -5 and $\frac{1}{5}$ are perpendicular; therefore two lines with these slopes create a right angle.

1. Plot the vertices of $ △ABC$ and find the lengths of each side using the distance formula.

**For all problems below:** Leave answers exact in square root form. (For example: $\sqrt{37}$ )

$A\left(5,8\right), B\left(-3,6\right), C(0,-5)$ AB = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 BC = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 CA = \_\_\_\_\_\_\_\_\_\_\_\_\_\_



Classify the triangle by its sides as scalene, isosceles, or equilateral. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This can be proven using the distance formula because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Plot the vertices of $△PQR$ and find the length of each side using the distance formula.

$P\left(0,8\right), Q\left(8,0\right), R(-3,-3)$ PQ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 QR = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 RP = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Classify the triangle by its sides and angles.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This can be proven using the distance formula because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Plot the vertices of $△JKL $ and find the length of each side using the distance formula.

$J\left(3,2\right), K\left(1, -3\right), L(-4, -5)$ JK = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 KL = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 LJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Classify the triangle by its sides and angles.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This can be proven using the distance formula because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Plot the vertices of $△DEF$ and find the length of each side using the distance formula.

$D\left(-2,0\right), E\left(3,3\right), F(1,-5)$ DE = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 EF = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 FD = \_\_\_\_\_\_\_\_\_\_\_\_\_\_



Compare the slopes of DE and DF.

Slope of DE = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­

Slope of DF = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

By analyzing the two slopes we can say that $∠EDF $is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

How would you classify this triangle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain your reasoning.

5. Plot the points and find the distance between them using the distance formula.

$G\left(6, 2\right), H\left(-1, 2\right), I(6, -3)$ GH = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 HI = \_\_\_\_\_\_\_\_\_\_\_\_\_\_

 IG = \_\_\_\_\_\_\_\_\_\_\_\_\_\_



Compare the slopes of GH and IG.

Slope of GH = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­­­­­­­­

Slope of IG = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

By analyzing the two slopes we can say that $∠IGH $is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

How would you classify this triangle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain your reasoning.