Lesson Context

BIG PICTURE of this UNIT:	• mastery with algebraic skills to be used in our work with co-ordinate geometry (midpoint, length, slope) • understanding various geometric properties of quadrilaterals & triangles • how do you really prove that something is "true"?		
CONTEXT of this LESSON:	Where we've been You know how to find a midpoint, a length & slope and how to work with GeoGebra	Where we are Using length, slope & midpoint in classifying geometric figures	Where we are heading How can I prove various geometric properties of quadrilaterals and triangles?

Lesson Objectives:

a. Review the properties of triangles through GeoGebra
b. Use algebraic methods to classify triangles

Warm-up:

Distance/Length: $d = \sqrt{\left(x_2 - x_1\right)^2 + \left(y_2 - y_1\right)^2}$

Slope: $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

Given the two points **A(-8,7)** and **B(2,-5)**. Find the:
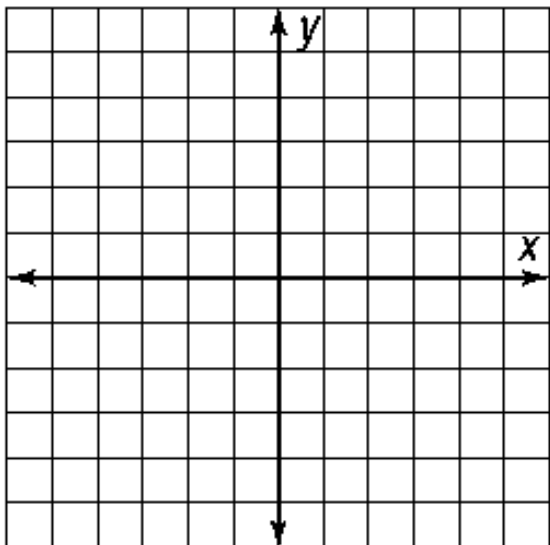a. distance

b. slope

Exploring Triangles – through dynamic geometry software: GeoGebra

Triangle Type:	Use these points to construct on GeoGebra:	Properties:	DESCRIBE HOW you would confirm each property algebraically:
Equilateral triangle	(4 , 0) (-6 ,0) (-1, 8.66025)		
Isosceles triangle	(0,8) (0,4) (4,6)		
Scalene triangle	(0,9) (3,2) (1,1)		
Right triangle	(0 , 8) (5 , 7) (2 , 5)		
Right isosceles triangle	(0 , 8) (8 , 9) (2 , 5)		

Classifying Triangles in the coordinate plane:

Classify ∆ABC by its sides. Then determine if the triangle is a right triangle. The vertices are A(0,0), B(3,3) and C(-3,3).

Step 1: Plot the points in the coordinate plane.

Step 2: Use the distance formula to find the side lengths:

AB =

BC =

CA =

Step 3: Check for right angles by checking the slopes.

Step 4: Classify ∆ABC.

Therefore ∆ABC is a _____ triangle.

The slope of $\overline{AB}$ =

The slope of $\overline{BC}$ =

The slope of $\overline{CA}$ =

Classifying Triangles in the coordinate plane:

Graph triangle ABC using points
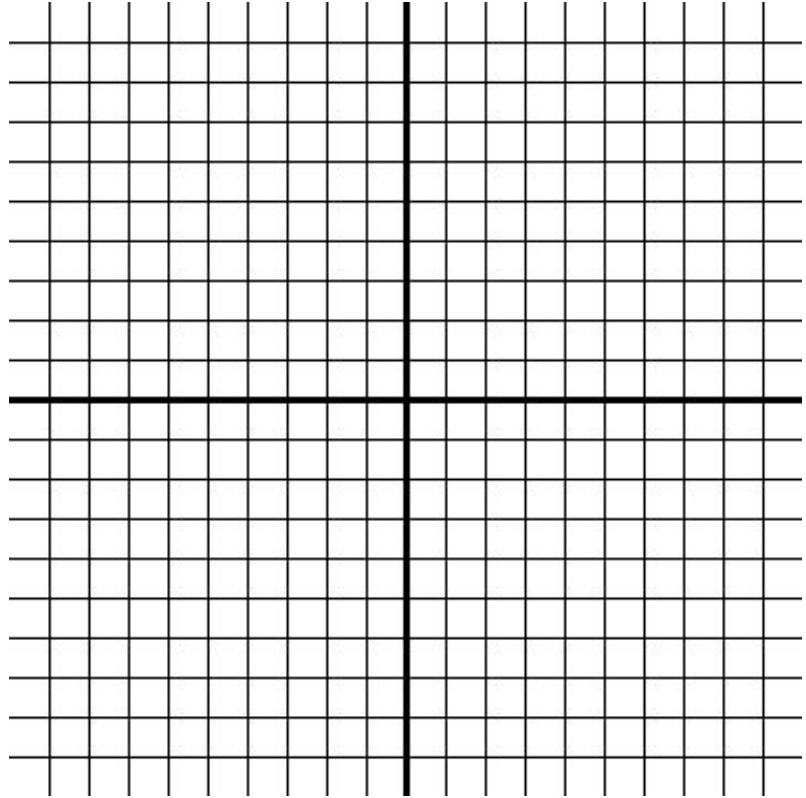A(0,-4), B(0,-9), and C(-2,-5)
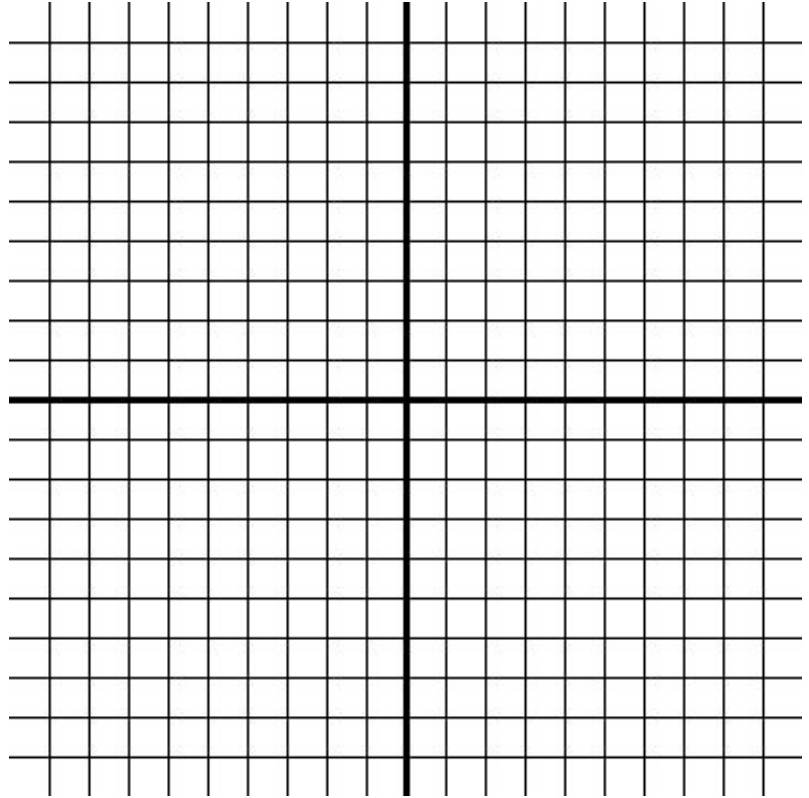
Classify triangle ABC:

a. Determine if triangle ABC is scalene, isosceles, or equilateral.
Explain your reasoning.

b. Explain why triangle ABC is a right triangle.

Classifying Triangles in the coordinate plane:

Graph triangle ABC using points
A(-2,4), B(8,4), and C(6,-2)
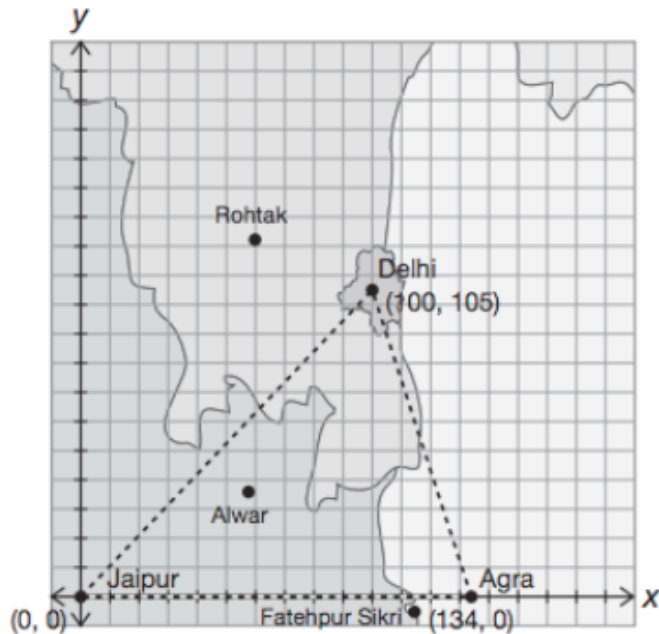
Classify triangle ABC:

a. Determine if triangle ABC is scalene,
isosceles, or equilateral.
Explain your reasoning.

b. Determine if triangle ABC is a right triangle.
Explain your reasoning.

Applications of Classifying Triangles:

India's Golden Triangle is a very popular tourist destination. The vertices of the triangle are the three historical cities of Delhi, Agra (Taj Mahal), and Jaipur.

The locations of these three cities can be represented on the coordinate plane as shown.

Classify India's Golden Triangle.

Additional practice opportunities:

Classifying triangles on Algebra Lab