



- I can classify triangles on the coordinate plane using slope and distance formulas.

Recall:

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

Distance formula:  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

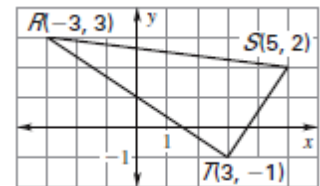
Two lines on the coordinate plane are **perpendicular** if \_\_\_\_\_.

To classify triangles on the coordinate plane:

- Use the distance formula to find the length of each side of the triangle.
  - If no sides are congruent, the triangle is \_\_\_\_\_.
  - If two sides are congruent, the triangle is \_\_\_\_\_.
  - If all three sides are congruent, the triangle is \_\_\_\_\_.
- Use the slope formula to determine if any sides are perpendicular to determine if the triangle is a right triangle.
  - IF** the triangle **IS** a right triangle, the right angle will always be opposite the longest side, so...  
\_\_\_\_\_

**Example:** Classify  $\triangle RST$  by its side lengths. Then determine if the triangle is a right triangle.

**Step 1:** Use distance formula to find the side lengths:



The triangle has \_\_\_\_\_ sides, so it is \_\_\_\_\_.

**Step 2:** Use slopes to determine if there is a right angle. The two shortest sides are \_\_\_\_ and \_\_\_\_ so find their slopes.

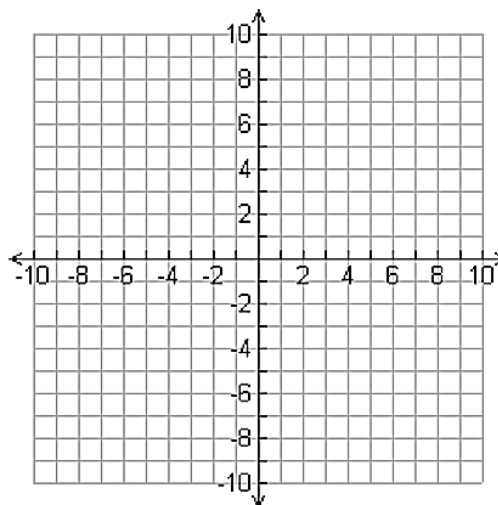
\_\_\_\_\_ and \_\_\_\_\_ are/are not perpendicular, therefore  $\angle$  \_\_\_\_\_ is/is not a right angle and  $\triangle RST$  is/ is not a \_\_\_\_\_.

**Solution:**  $\triangle RST$  is \_\_\_\_\_

Think you got it? Great! Try a couple on your own 😊

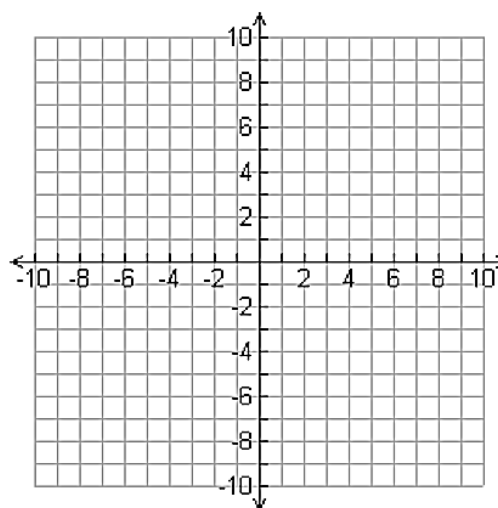
- 1) The vertices of  $\triangle XYZ$  are  $X(-2,3)$ ,  $Y(-2,-7)$ , and  $Z(4,-5)$ .

Classify  $\triangle XYZ$  by its side lengths, then determine if the triangle is a right triangle.



- 2) The vertices of  $\triangle PQR$  are  $P(-3,-1)$ ,  $Q(-4,4)$ , and  $R(7,1)$ .

Classify  $\triangle XYZ$  by its side lengths, then determine if the triangle is a right triangle.



Geometry

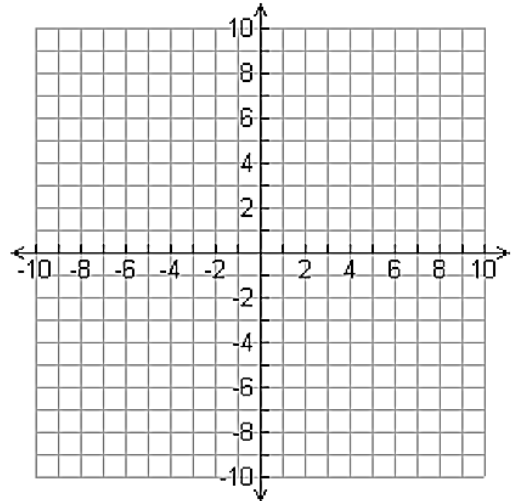
Homework: 4.1/4.7 Coordinate Proofs

Name: \_\_\_\_\_

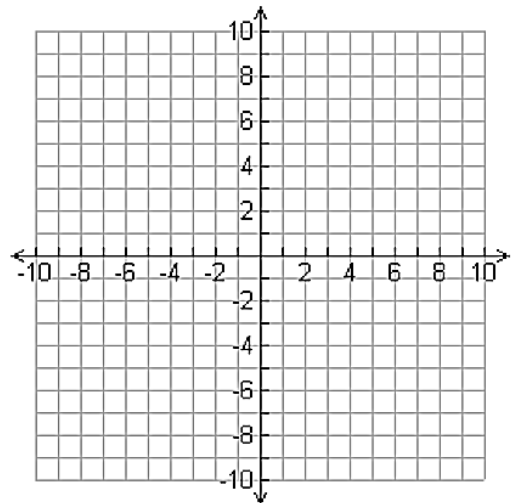
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A triangle has the given vertices. Graph the triangle and classify it by its side lengths. Determine if the triangle is a right triangle.

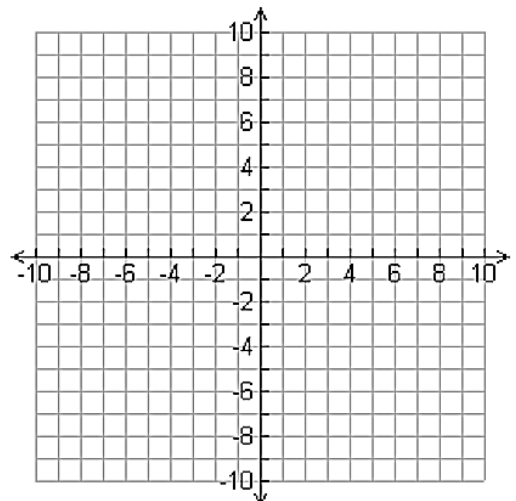
1.  $A(-3, 3)$ ,  $B(2, 8)$ ,  $C(7, 3)$



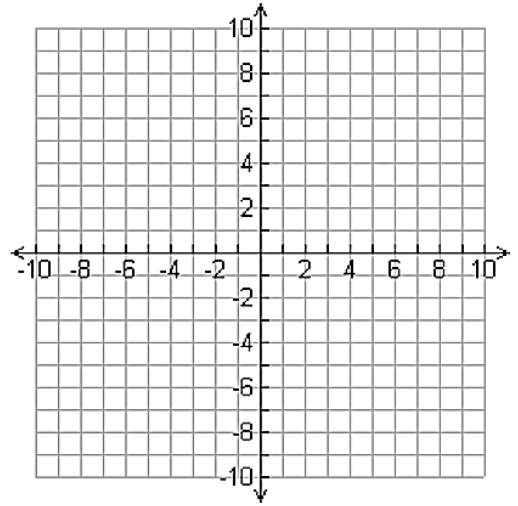
2.  $D(1, 1)$ ,  $E(4, 0)$ ,  $F(8, 5)$



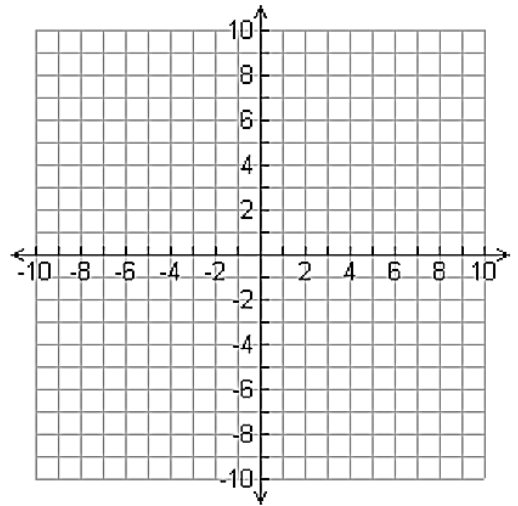
3.  $G(1, -3)$ ,  $H(2, -6)$ ,  $I(-1, -5)$



4.  $J(0, 0)$ ,  $K(6, 0)$ ,  $L(3, \sqrt{27})$



5.  $M(0, 0)$ ,  $N(1, 3)$ ,  $O(3, 1)$



Extension Questions...

6. In  $\triangle ABC$ , which angles can you conclude are congruent? Why? What is the measure of  $\angle A$ ?
7. Which triangles can you conclude are congruent? Why?
8. In  $\triangle JKL$ , what is the measure of  $\angle K$ ?

Answers:

1) Right Isosceles 2) Scalene 3) Isosceles 4) Equilateral 5) Isosceles 6)  $\angle A \cong \angle B$ ; both are  $45^\circ$  7)  $\triangle GHI \cong \triangle MNO$  because all of their corresponding sides are congruent. 8)  $m\angle K = 60^\circ$