

$$d = \sqrt{\Delta x^2 + \Delta y^2}$$

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$a^2 + b^2 = c^2$ for
right triangle

Date _____
Geometry

Coordinate Geometry Triangle Proofs

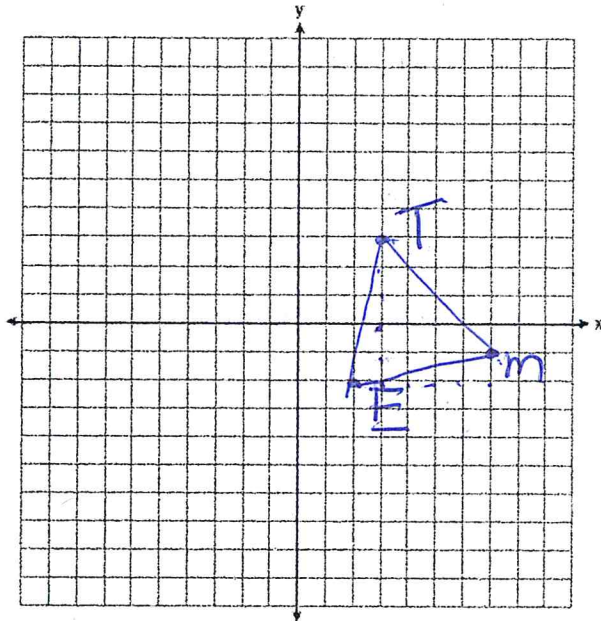
1. Triangle MET has vertices M(7,-1), E(2,-2) and T(3,3). Prove that MET is an isosceles triangle.

1) ~~ABC~~ MET is an isosceles triangle because it has two congruent sides.

$$2) d_{ME} = \sqrt{5^2 + 1^2} = \sqrt{25 + 1} = \sqrt{26}$$

$$d_{ET} = \sqrt{1^2 + 5^2} = \sqrt{1 + 25} = \sqrt{26}$$

3) $\overline{ME} \cong \overline{ET}$ because they have the same distance.



2. The vertices of ΔABC are A(0,10) B(5,0) and C(8,4). Prove that ΔABC is a right triangle.

1) ABC is a right triangle because its sides fit into Pythagorean Theorem.

$$2) d_{AC} = \sqrt{8^2 + 10^2} = \sqrt{64 + 100} = \sqrt{164}$$

$$d_{CB} = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25}$$

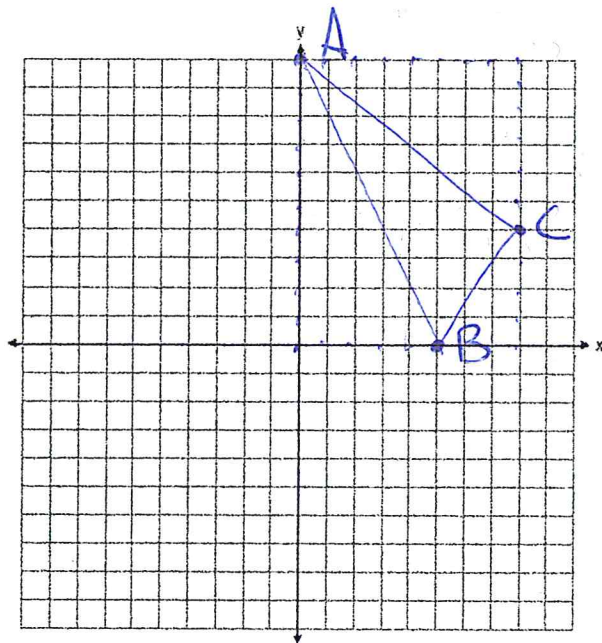
$$d_{BA} = \sqrt{5^2 + 10^2} = \sqrt{25 + 100} = \sqrt{125}$$

$$3) a^2 + b^2 = c^2$$

$$\sqrt{100^2} + \sqrt{25^2} = \sqrt{125^2}$$

$$100 + 25 = 125$$

$$125 = 125 \checkmark$$



3. Triangle JOY has vertices J(4,0), O(5,4) and Y(1,5). Prove that JOY is an isosceles right triangle.

1) JOY is an isosceles right triangle because it has two congruent sides and its sides fit into Pythagorean Theorem.

$$2) d_{JO} = \sqrt{4^2 + 1^2} = \sqrt{16+1} = \sqrt{17}$$

$$d_{JO} = \sqrt{1^2 + 4^2} = \sqrt{1+16} = \sqrt{17}$$

$$d_{JY} = \sqrt{3^2 + 5^2} = \sqrt{9+25} = \sqrt{34}$$

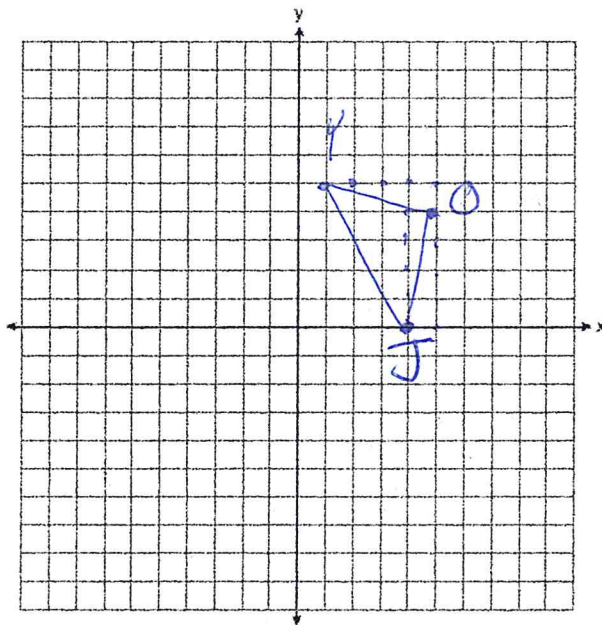
3) $\overline{JO} \cong \overline{JO}$ because they have the same distance.

$$a^2 + b^2 = c^2$$

$$\sqrt{17}^2 + \sqrt{17}^2 = \sqrt{34}^2$$

$$17 + 17 = 34$$

$$34 = 34 \checkmark$$



4. Prove that the triangle whose vertices are A(0,2), B(2,3), and C(1,5) is a right triangle.

1) ABC is a right triangle because its sides fit into Pythagorean Theorem.

$$2) d_{AB} = \sqrt{2^2 + 1^2} = \sqrt{4+1} = \sqrt{5}$$

$$d_{BC} = \sqrt{1^2 + 2^2} = \sqrt{1+4} = \sqrt{5}$$

$$d_{AC} = \sqrt{1^2 + 3^2} = \sqrt{1+9} = \sqrt{10}$$

$$3) a^2 + b^2 = c^2$$

$$\sqrt{5}^2 + \sqrt{5}^2 = \sqrt{10}^2$$

$$5 + 5 = 10$$

$$10 = 10 \checkmark$$

