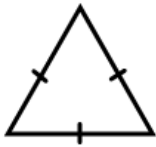


Lesson 6: Proving Special Triangles

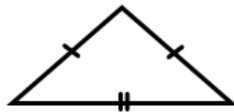
Standard: G.GPE.4: Use coordinates to prove simple geometric theorems algebraically. **G.GPE.5:** Prove the slope criteria for parallel and perpendicular lines; use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Essential Question: How do you use coordinates to prove special triangles?

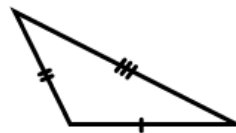
Classifying Triangles by their Sides



Equilateral - all sides congruent

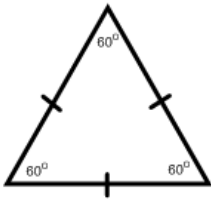


Isosceles - two sides congruent

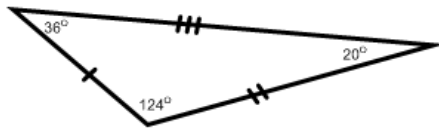


Scalene - no sides are congruent

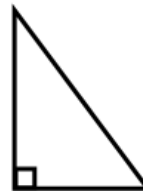
Classifying Triangles by their Angles



Acute - all angles acute



Obtuse - one obtuse angle



Right - one right angle

You can classify triangles by their sides. Each side of a triangle is a line segment. Congruent sides are indicated by the tick marks on the sides of the figure. All triangles have at least two acute angles. A triangle can also be classified according to the angle measure of its third angles.

When a figure is in the coordinate plane, you can use the Distance Formula to prove that sides are congruent and you can use the slope formula to prove that sides are parallel or perpendicular

Important formulas (YOU NEED TO KNOW THESE!)

Slope:

Midpoint:

Distance (length):

THREE PARTS

- Formulate a plan
- Use slope, midpoint, and/or distance formulas to execute plan

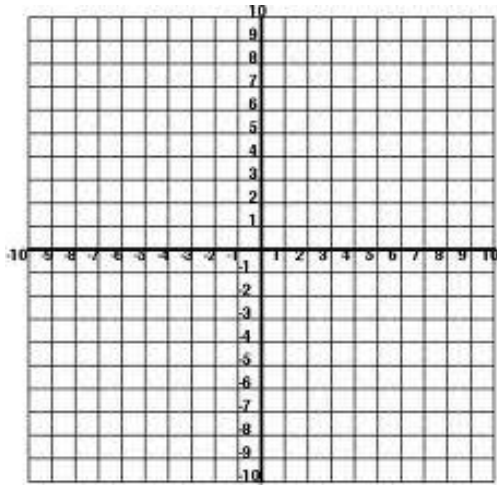
Prove a triangle is a:

-right triangle

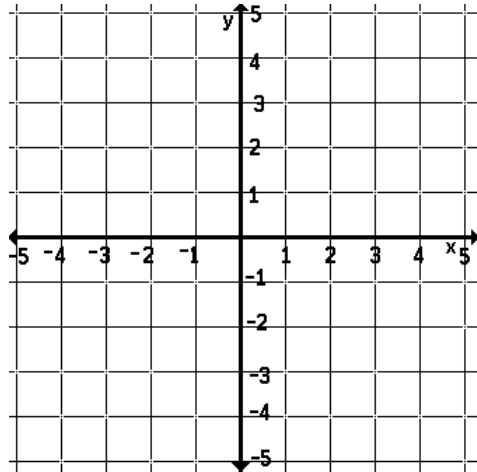
-isosceles triangle

-equilateral triangle

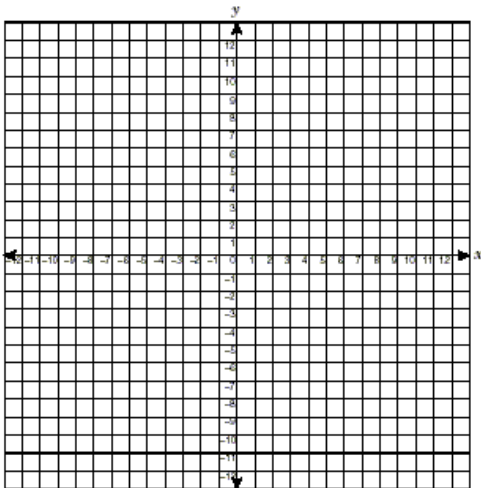
1. Triangle AFN has vertices A (-7, 6), F (-1, 6), and N (-4, 2).
Prove triangle AFN is an isosceles triangle.



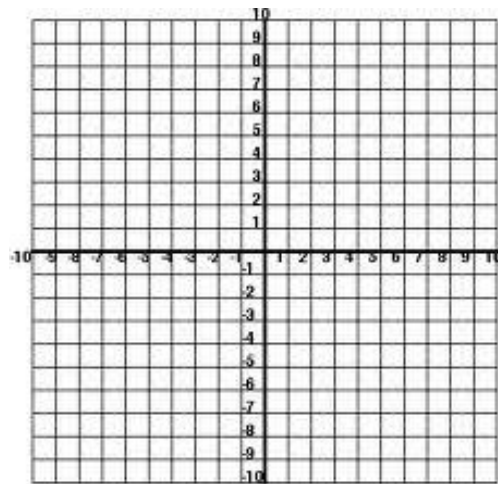
3. The vertices of triangle ABC are A (0, 0), B (2, 3), and C (4, 0). Prove that it is isosceles



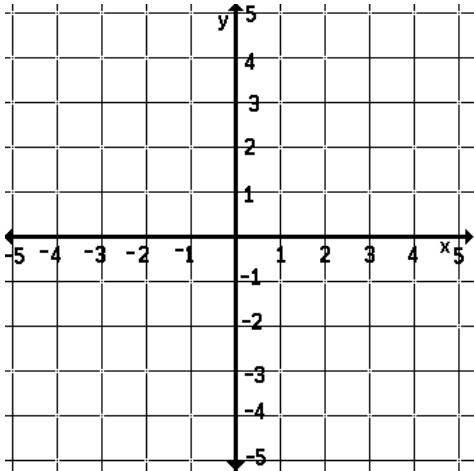
2. Triangle MEP has vertices M (6, 12), E (6, 4), and P (3, 8).
Prove triangle MEP is a right triangle but *not* isosceles.



4. Prove that A (1, 1), B (4, 4), and C (6, 2) are the vertices of a right triangle.



5. The vertices of $\triangle ABC$ are A (-3, 1), B (-2,-1), and C (2, 1). Show that $\triangle ABC$ is a right triangle



Triangles

Isosceles Triangle

-using distance formula, prove that only two sides are congruent

Right Triangle

-using slope formula, prove that two sides are perpendicular (right angle)

Equilateral Triangle

-using distance formula, prove that all sides are congruent

6. The vertices of $\triangle ABC$ are A (-1, 5), B (5, 3) and C (1, 1). Prove that $\triangle ABC$ is an isosceles right triangle.

