Geometry 4.8
Position and label triangles for use in coordinate proofs
Write coordinate proofs

proof
coordinate proof...a little bit more like a paragraph proof

position can make the problem easier or harder
- make good choices: coordinate axes etc.
- use as few variables as possible

calculate slope, distance, etc. using coordinates
show that corresponding parts are congruent, parallel, etc.

Quiz 4.7-4.8 +
Constructions Wed.

p. 303

KeyConcept Placing Triangles on Coordinate Plane

Step 1 Use the origin as a vertex or center of the triangle.

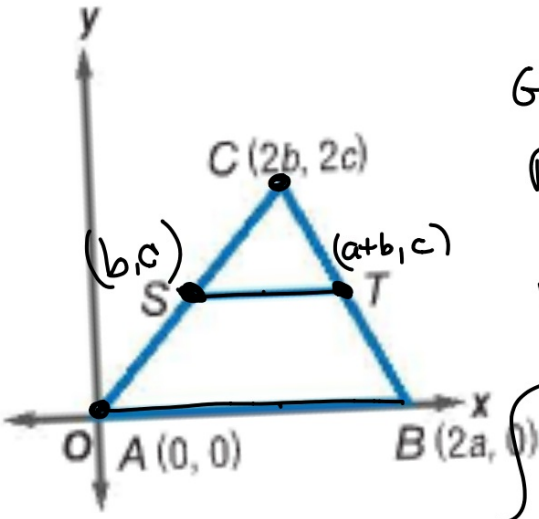
Step 2 Place at least one side of a triangle on an axis.

Step 3 Keep the triangle within the first quadrant if possible.

Step 4 Use coordinates that make computations as simple as possible.

Example 3 Write a Coordinate Proof

Write a coordinate proof to show that a line segment joining the midpoints of two sides of a triangle is parallel to the third side.



Show that slope of ST = slope of AB

Given S & T are mp's

Prove $\overline{ST} \parallel \overline{AB}$

1. given S & T are midpoints	1. given

Coord. S $\left(\frac{2b+0}{2}, \frac{2c+0}{2}\right) = (b, c)$

Coord T $\left(\frac{2b+2a}{2}, \frac{2c+0}{2}\right) = (b+a, c)$

Slope $\overline{ST} = \frac{c-c}{a+b-b} = \frac{0}{a} = 0$

Slope $\overline{AB} = \frac{0-0}{2a-0} = 0$

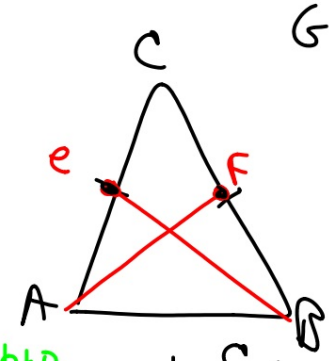
$\overline{ST} \parallel \overline{AB}$ bec. slopes are =

whiteboards

Whiteboards

CCSS ARGUMENTS **Write a coordinate proof for each statement.**

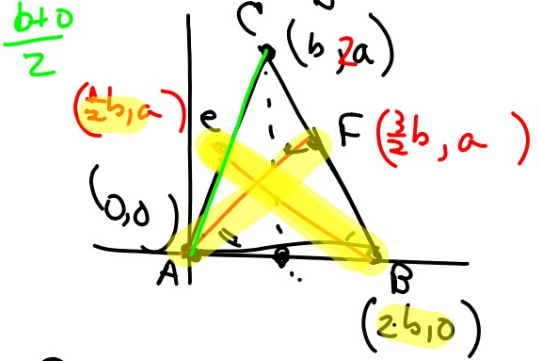
19. The segments joining the base vertices to the midpoints of the legs of an isosceles triangle are congruent.



Given isos $\triangle$ $\overline{CB} \cong \overline{CA}$

e is mp $\overline{AC}$, F is mp $\overline{CB}$

Pr: $\overline{AF} \cong \overline{BE}$



1. $\overline{CB} \cong \overline{CA}$, e+F are mps.	1. given

Coords of E $\left(\frac{b+0}{2}, \frac{2a+0}{2}\right) = \left(\frac{1}{2}b, a\right)$

Coords F $\left(\frac{b+2b}{2}, \frac{2a+0}{2}\right) = \left(\frac{3}{2}b, a\right)$

$BE = \sqrt{(1.5b)^2 + (-a)^2} = \sqrt{2.25b^2 + a^2}$

$AF = \sqrt{(1.5b)^2 + (a)^2} = \sqrt{2.25b^2 + a^2}$

So $BE = AF$

$0 - a = -a$