

NAME: _____

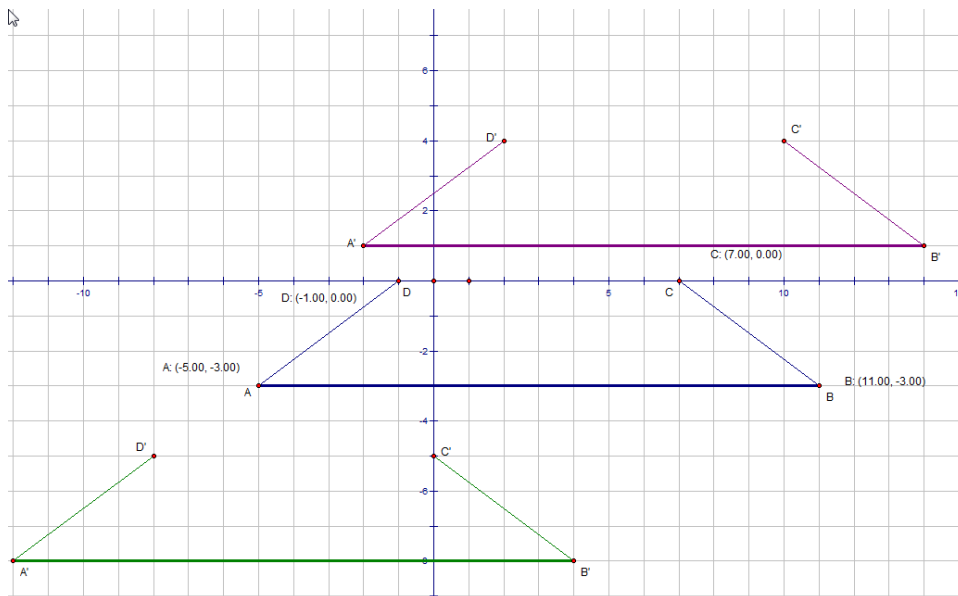
CLASS: _____

Geometry Lab 9A

Creating Triangles Using Two Angles and One Included Side

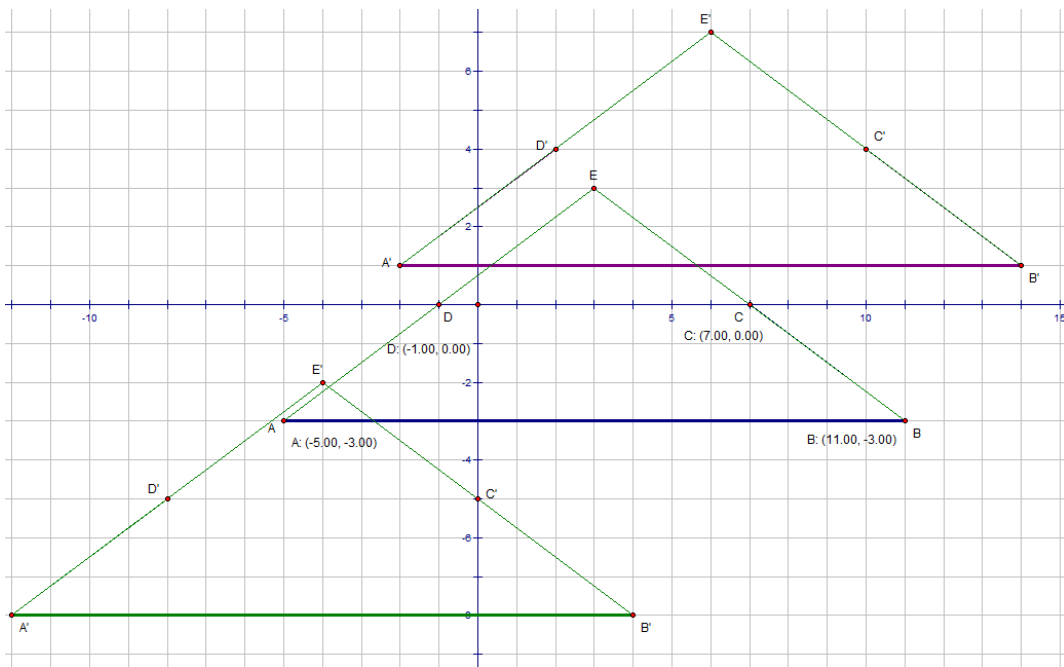
1. On a piece of graph paper, graph and label the following coordinates: A(-5, -3), B(11, -3), C(7, 0), D(-1, 0).
2. Connect the following points only: A & B, B & C, A & D. DO NOT connect points C & D.
3. Measure $\angle DAB$ & $\angle CBA$ to the nearest degree with your protractor and measure \overline{AB} by counting the square units.
4. $\angle DAB =$ _____ degrees, $\angle CBA =$ _____ degrees, $\overline{AB} =$ _____ units. You have now created and measured two angles and one included side.
5. Perform either one of the following two translations on each coordinate: $T_{(-7,-5)}$ or $T_{(3,4)}$. Alternatively you can apply any translation of your choice (as long as all points can fit on the graph paper).
6. Label and state the new coordinates on your graph paper.
7. Connect the following points only: A' & B', B' & C', A' & D'. DO NOT connect points C' & D'.

Your graph should look either like the blue & the green or the blue & the purple figures (however yours should also state the coordinates!)



8. Using your straight edge carefully, extend line segment AD and line segment BC with straight lines until they intersect and form a triangle. Label the intersection point E and find its coordinate.
9. Do the same with your translated figure and label the intersection point E'. It's OK if the two triangles overlap.

Your graph should look like either the blue & the green or the blue & the purple figures (however yours should also state the coordinates!)



10. Using the distance formula, calculate the length of the line segments you just created: AE _____ units, BE _____ units, A'E' _____ units, B'E' _____ units
11. Find the area of the two triangles you created (remember, the area of a triangle = $\frac{1}{2} b \cdot h$). Let each square on your graph paper count as 1 unit. Area of triangle ABE = _____ square units. Area of triangle A'B'E' = _____ square units.
12. Using the measurements of the sides you created and the area of the triangles you calculated, what relationship do these triangles have to each other? _____.
13. When you extended the line segments in both original figures to create triangles, how many different size triangles were you able to create? _____
14. Copy the following theorem in your notes:

“Theorem: If two angles and the included side of one triangle are equal to two angles and the included side of the other triangle, the two triangles must be _____.

This is also known as the ___ ___ ___ triangle congruence theorem.”