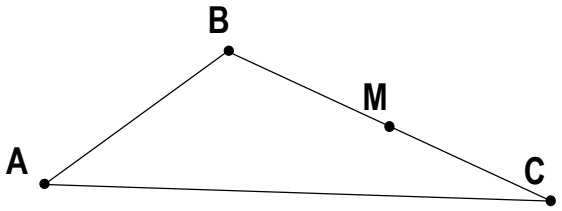
4.4

Name (print first and last) _____ **Per**_____ **Date:** 11/19 due 11/21

4.4 Angles: Triangles + **Geometry Regents 2013-2014 Ms. Lomac**

SLO: I can prove that the sum of the angles is 180° and use that information to solve problems.

(1) ☐ Construct 180° rotation of △ABC around point midpoint M. Lightly shade △A' B' C'



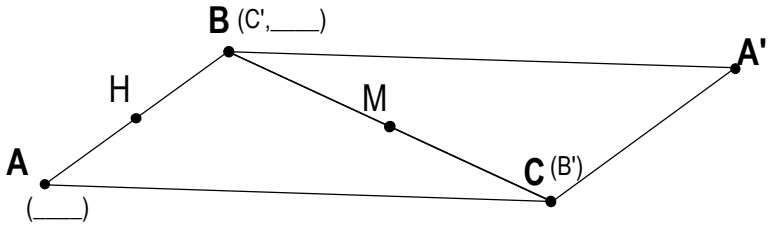
(2) ☐ Use the construction in problem #1 to answer each question below. Mark congruent angles in the diagram.

☐ (a) List the pairs of congruent angles: _____ _____ _____

☐ (b) Name the angle relationship between ∠BCA and ∠CBA': _____

☐ (c) $\overline{AC} \parallel \overline{C'A'}$ because ∠BCA and ∠CBA' are _____ _____ _____ _____

(3) ☐ Construct 180° rotation of △ABC around point midpoint H. Lightly shade △A"B"C".



(4) ☐ Use the construction in problem #3 to answer each question below. Mark congruent angles in the diagram.

☐ (a) List the pairs of congruent angles from this rotation: _____ _____ _____

☐ (b) Name the angle relationship between ∠BAC and ∠ABC": _____

☐ (c) $\overline{AC} \parallel \overline{C"B}$ because ∠BAC and ∠ABC" are _____ _____ _____ _____

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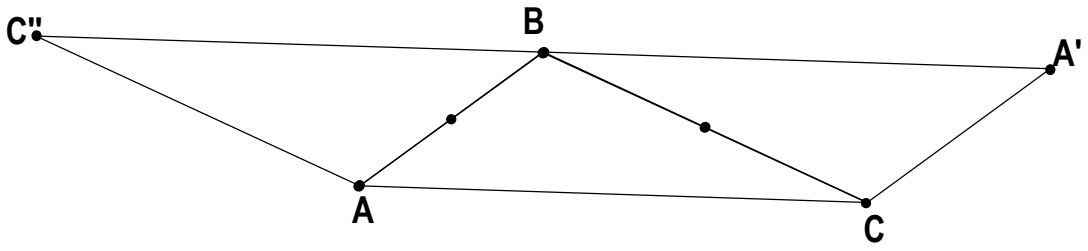
(5) ☐ **AS YOU COMPLETE THIS PROBLEM, MARK CONGRUENT ANGLES IN THE DIAGRAM TO MINIMIZE CONFUSION. Use different colors for parts a and b.**



☐ (a) In problem #2(c), you stated that ∠BCA ≅ ∠CBA'. Mark them congruent in the diagram above.

☐ (b) In problem #4(c), you stated that ∠BAC ≅ ∠ABC". Mark them congruent in the diagram above.

☐ (c) ∠C"BA' is a _____ angle which means that m∠ABC" + m∠ABC + m∠CBA' = _____

☐ (d) If m∠ABC" + m∠ABC + m∠CBA' = _____ then we can **substitute** equal values into the equation

_____ + m∠ABC + _____ = _____

REMEMBER
∠BAC ≅ ∠ABC" (part b)
∠BCA ≅ ∠CBA' (part a)

☐ (e) ∠BAC, ∠ABC, ∠BCA are the three angles in the triangle.

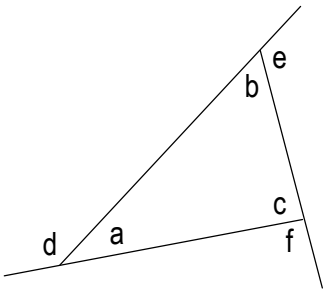
You have just proven the **triangle sum theorem**: *the sum of the angles in any triangle is* _____°.

(6) ☐ **Exterior angles** of triangles.

☐ (a) The angles inside a triangle are called **interior angles**. The angles formed by the extension of a side of a triangle are called **exterior angles**.

The **interior angles** in the diagram at right are _____, _____, and _____

The **exterior angles** in the diagram at right are _____, _____, and _____



☐ (b) Provide a reason for each step below.

a + d = 180° _____

↳ d = **180° – a** _____

a + b + c = 180° _____

↳ b + c = **180° – a** _____

Because d = **180° – a**

and b + c = **180° – a**

d = _____ by substitution

The **exterior angle theorem** states that

*the measure of an **exterior angle** of a triangle is equal to the sum of the **remote interior angles**.*

(picture yourself at b and your friend at c sitting on the couch using a remote to control the television at d).

☐ (c) Write equations for the other two **exterior angles**.

_____ AND _____

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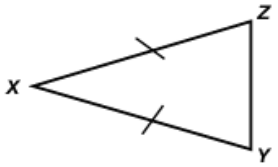
(7) ☐ **Isosceles triangles**

☐ (a) Is there a way to fold **isosceles triangle** XYZ exactly in half?_____



Draw a line where the crease would be.

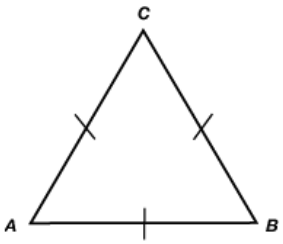
Complete each congruence statement $\overline{XY} \cong$ _____ $\angle Y \cong$ _____

$\angle$Y and $\angle$Z are called **base angles**. **Base angles** of isosceles triangles are always _____.

$\angle$X is called the **vertex angle**.

(8) ☐ **Equilateral Triangles**

☐ (b) How many ways can **equilateral triangle** ABC be folded exactly in half?_____



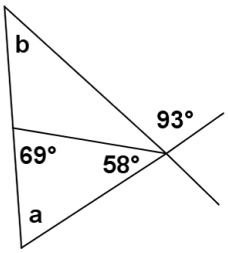
Complete the congruence statement $\angle A \cong$ _____ $\cong$ _____

Since all of the angles in an equilateral triangle are _____,

each angle in an equilateral triangle always measures _____

(9) ☐ Use the triangle sum theorem and your angle notes sheet to name a relationship, write an equation, and solve the problem. Mention parallel lines when needed. REMEMBER: Reasons can ONLY include relationships to angles that are already known. Add auxiliary lines if necessary. Do 8 of the 14 problems below.

☐ (a)



_____ because _____

_____ because _____

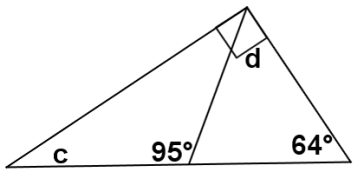
_____ because _____

_____ because _____

_____ because _____

_____ because _____

☐ (b)



_____ because _____

_____ because _____

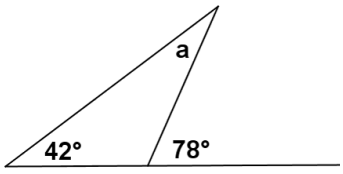
_____ because _____

_____ because _____

_____ because _____

_____ because _____

☐ (c)



_____ because _____

_____ because _____

_____ because _____

_____ because _____

_____ because _____

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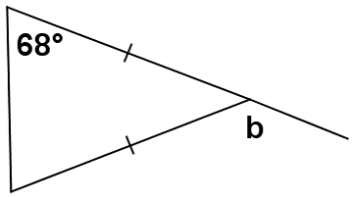
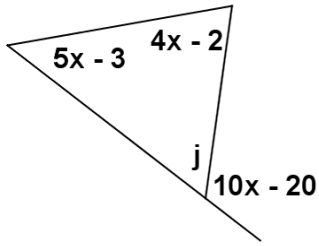
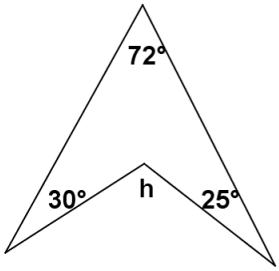
☐ (d)



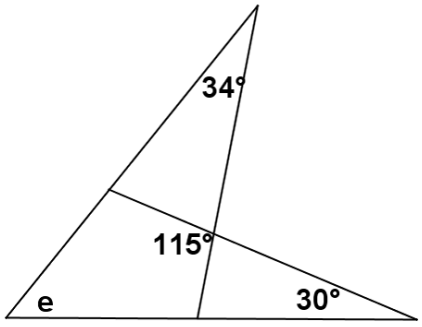
☐ (e)



☐ (f)



☐ (g)



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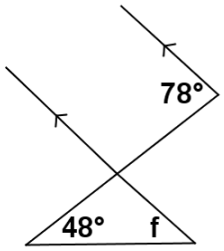
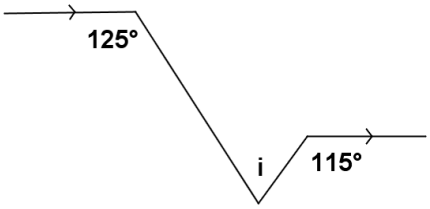
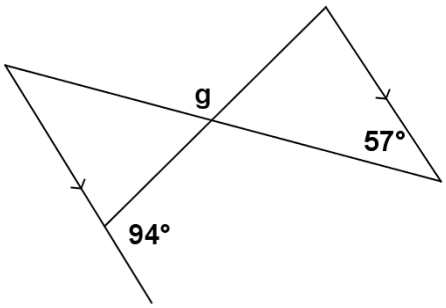
☐ (h)



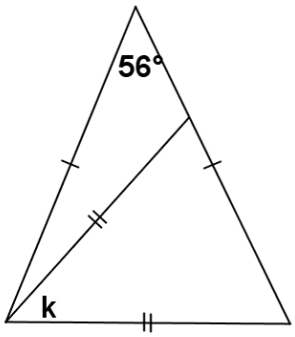
☐ (i)



☐ (j)



☐ (k)



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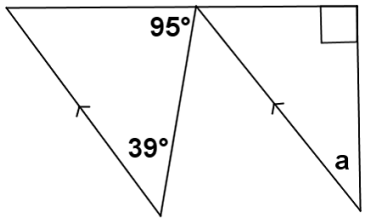
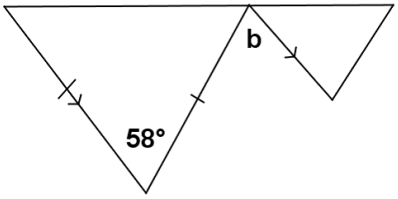
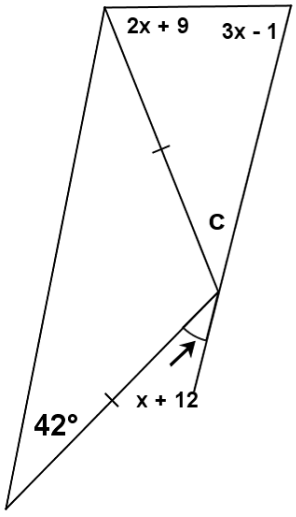
☐ (l)



☐ (m)



☐ (n)



4.4 Exit Ticket Name____Per______

Find the measure of angle b.

- ☐ I got this!
- ☐ I can with a bit of help
- ☐ I will, given lots of help
- ☐ I can't
- ☐ I won't bother to
- ☐ I refuse to

____________________ because ____

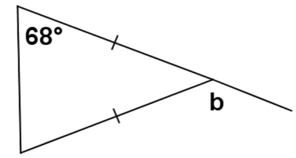
____________________ because ____

____________________ because ____

____________________ because ____

____________________ because ____

____________________ because ____



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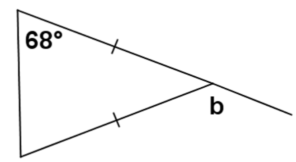

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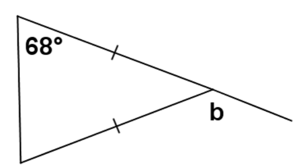

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