

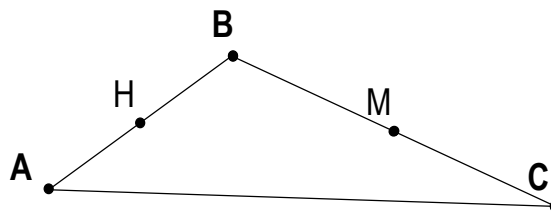
Name _____ Per _____

LO: I can solve problems involving interior and exterior angles of triangles and explain my reasoning. I can prove the triangle sum theorem

 DO NOW On the back of this packet

(1) **Triangle sum and rotations** Rotations preserve _____ and _____

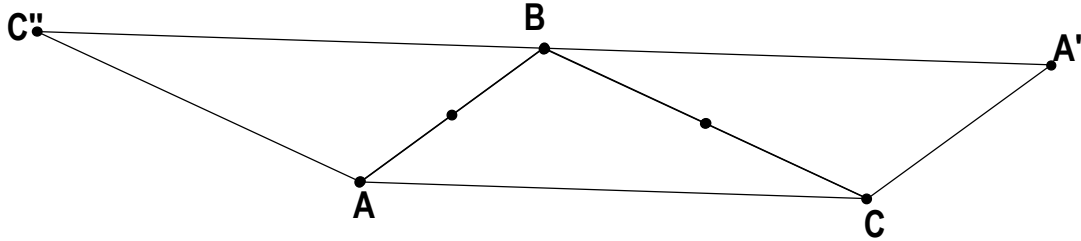
transparencies, dry erase markers, erasers, compass



- (a) Highlight $\angle A$ pink, $\angle B$ blue, and $\angle C$ yellow
- (b) Construct 180° rotation of $\triangle ABC$ around point midpoint M and label A' . Why don't we need to label B' and C' ? _____
- (c) Mark congruent angles with the same color highlighter.
- (d) List the pairs of congruent angles: _____
- (e) Name the angle relationship between $\angle BCA$ and $\angle CBA'$: _____
- (f) $\overline{AC} \parallel \overline{C'A'}$ because $\angle BCA$ and $\angle CBA'$ are _____
- (g) Construct 180° rotation of $\triangle ABC$ around point midpoint H and label C'' . Why don't we need to label A'' and B'' ? _____
- (h) Mark congruent angles with the same color highlighter.
- (i) List the pairs of congruent angles: _____
- (j) Name the angle relationship between $\angle BCA$ and $\angle CBA''$: _____
- (k) $\overline{AC} \parallel \overline{C''B}$ because $\angle BAC$ and $\angle ABC''$ are _____

(2) **Angles: Rotations and proving the sum of the interior angles of a triangle**

transparencies, dry erase markers, erasers compass



- (a) Mark the pink, blue, and yellow angles like you did in problem number 1.
- (b) In problem #1(d), you stated that $\angle CBA' \cong \angle BCA$. In problem #1(i), you stated that $\angle ABC'' \cong \angle BAC$.
- (c) $\angle C''BA'$ is a _____ angle which means that $m\angle CBA' + m\angle ABC + m\angle ABC'' =$ _____
- (d) If $m\angle CBA' + m\angle ABC + m\angle ABC'' =$ _____ then we can **substitute** equal values into the equation

$$\downarrow \qquad \qquad \qquad \downarrow$$

$$\text{_____} + m\angle ABC + \text{_____} = \text{_____}$$

REMEMBER
 $\angle CBA' \cong \angle BCA$
 $\angle ABC'' \cong \angle BAC$
- (e) $\angle BAC, \angle ABC, \angle BCA$ are the three angles in the triangle.

You have just proven the **triangle sum theorem**: the sum of _____.

(4) **Angles: Rotations and angle measures**

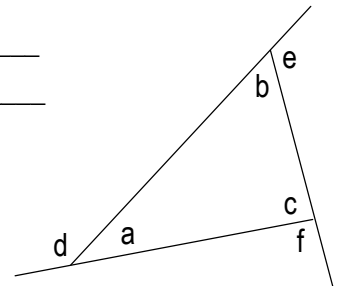
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Exterior angles of triangles.

- (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.

$a + d = 180^\circ$ _____

$\hookrightarrow d = 180^\circ - a$ _____

$a + b + c = 180^\circ$ _____

$\hookrightarrow b + c = 180^\circ - a$ _____

Because $d = 180^\circ - a$

and $b + c = 180^\circ - a$

$d =$ _____ 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 _____

Isosceles triangles

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

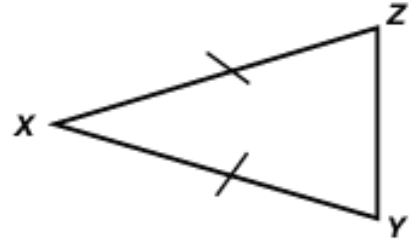
(b) Draw a line where the crease would be.

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

(d) $\angle Y$ and $\angle Z$ are called **base angles**.

Base angles of isosceles triangles are always _____.

(e) $\angle X$ is called the **vertex angle**.

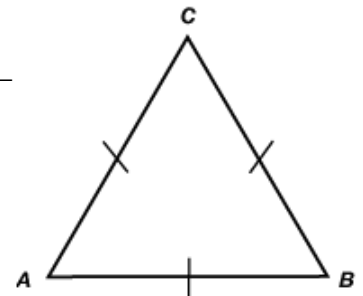


Equilateral Triangles

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

(b) Complete the congruence statement $\angle A \cong$ _____ \cong _____

(c) Since all of the angles in an equilateral triangle are _____,
each angle in an equilateral triangle always measures _____



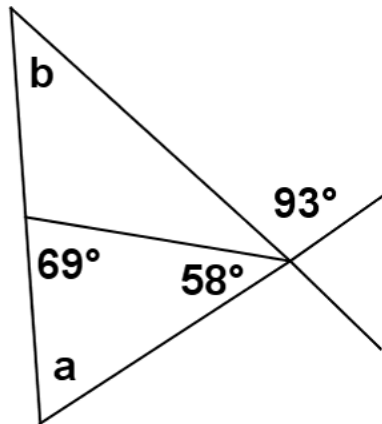
(4)

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Angles: Using Triangle Sum

Use the triangle sum theorem and your angle notes sheet to name a relationships, write equations, and solve to find the values of the variables in each diagram. Mention parallel lines when needed. REMEMBER: Reasons can ONLY include relationships to angles that are already known. Add auxiliary lines if necessary.

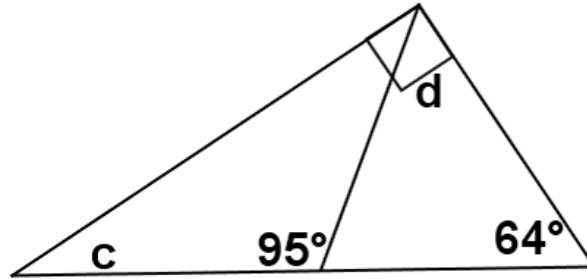
(a)



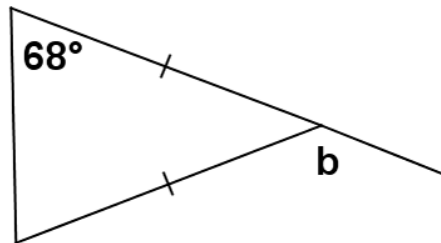
_____ because _____

(4) **Angles: Using Triangle Sum**

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 (b)

because

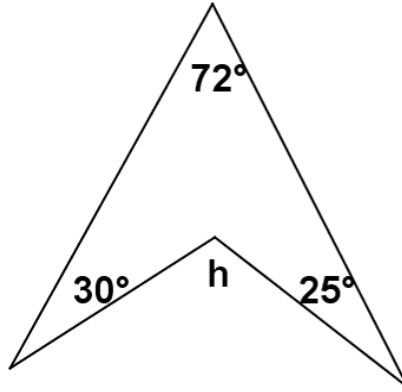
 (c)

because

(4) **Angles: Using Triangle Sum**

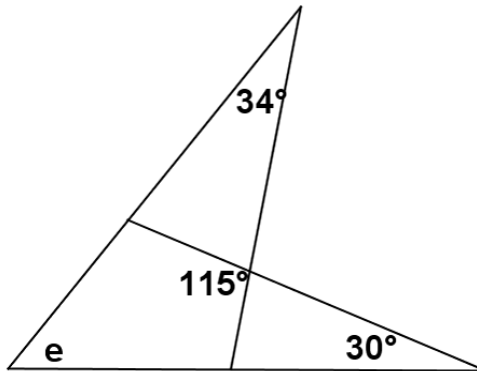
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(d)



_____ because _____

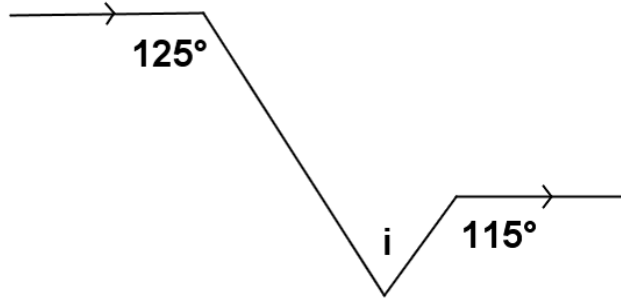
(e)



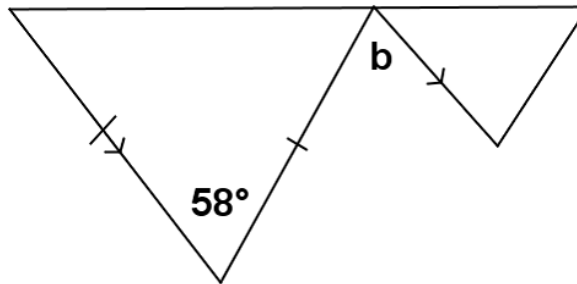
_____ because _____

(4) **Angles: Using Triangle Sum**

cont.
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cies, dry
erase
markers,
erasers

 (f)


because

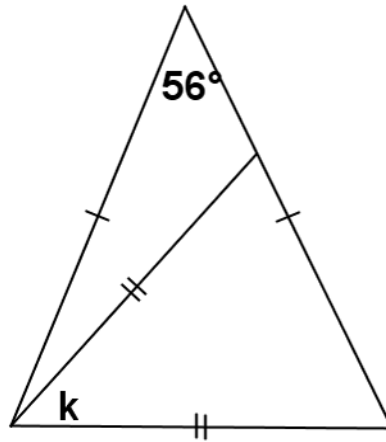
 (g)


because

(4) Angles: Using Triangle Sum

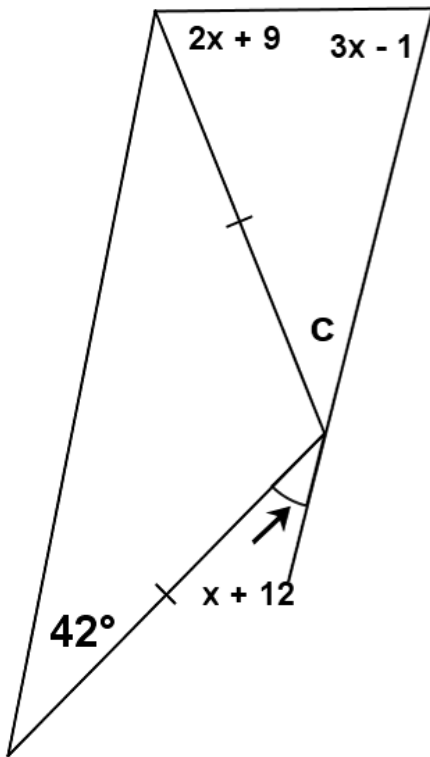
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(h)



because

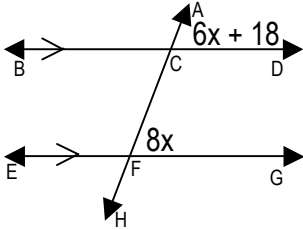
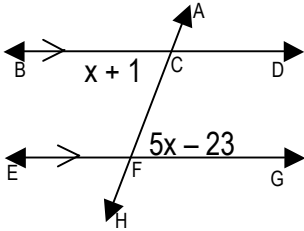
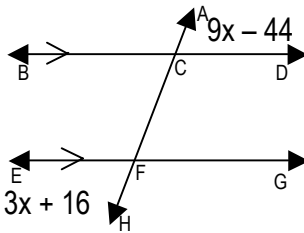
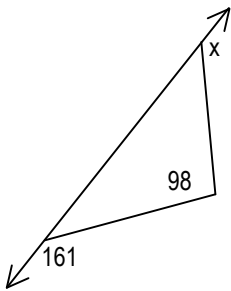
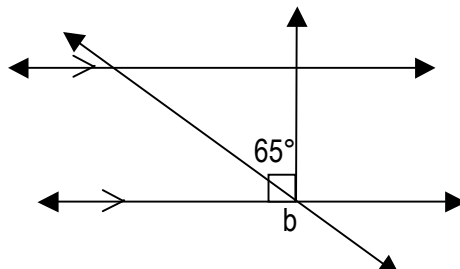
(i)



because

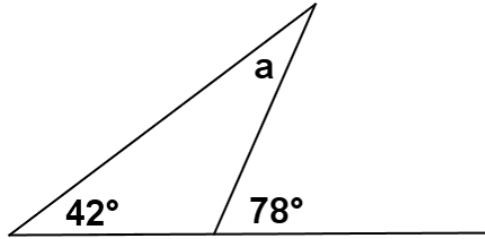
(5) **Exit Ticket**

ON THE LAST PAGE

 (6) **Homework** Do all of #1-5 and 2 problems from #6-9
pen or
pencil
 (1) Find the measure of angle ACD

 (2) Find the measure of angle BCF

 (3) Find the measure of angle BCA

 (4) Find the measure of x .

 (5) Find the measure of b .


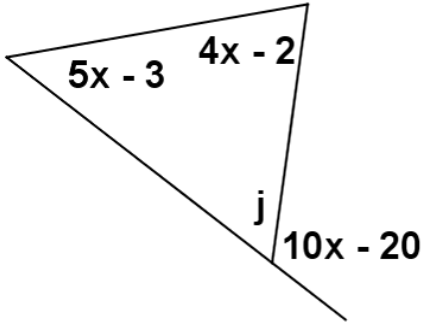
(6) Homework
pen or pencil

(6)



_____ because _____

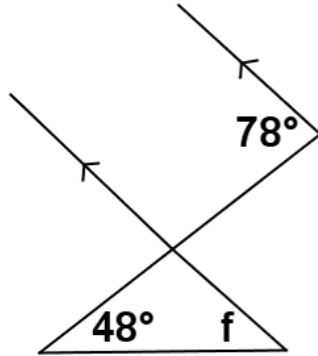
(7)



_____ because _____

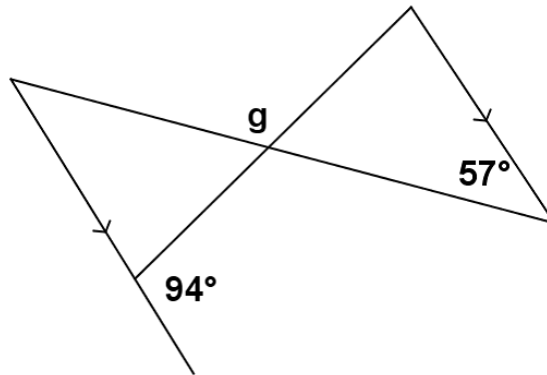
(6) **Homework**
pen or
pencil

(8)



because

(9)



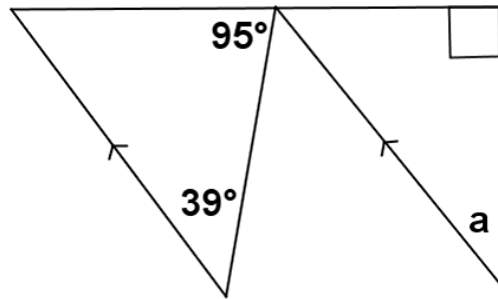
because

Exit Ticket Name _____ Date _____ Per _____

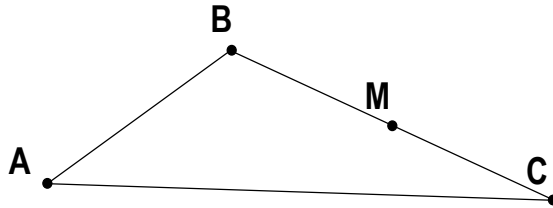
3.4R

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Find the measure of angle a . Justify your work by showing equations and stating any angle relationships you use.

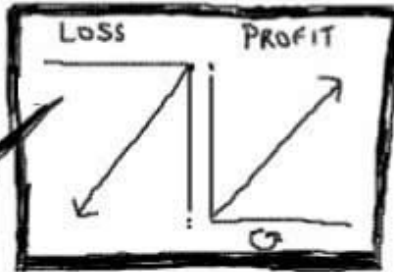
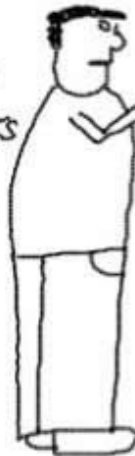


- (1) In the diagram below, M is the midpoint of segment BC. Trace the triangle on a plastic sheet and rotate 180° around point M. Draw the rotation of the triangle on your paper. What do you notice about points B and C?



- (2) Describe why the cartoon below is supposed to make people smile. REALLY think about it.

WE TRIED
EVERYTHING
TO CONVERT
THESE LOSSES
IN TO PROFITS



WHILE ALL WE NEEDED
TO DO WAS ROTATE
THE GRAPH...