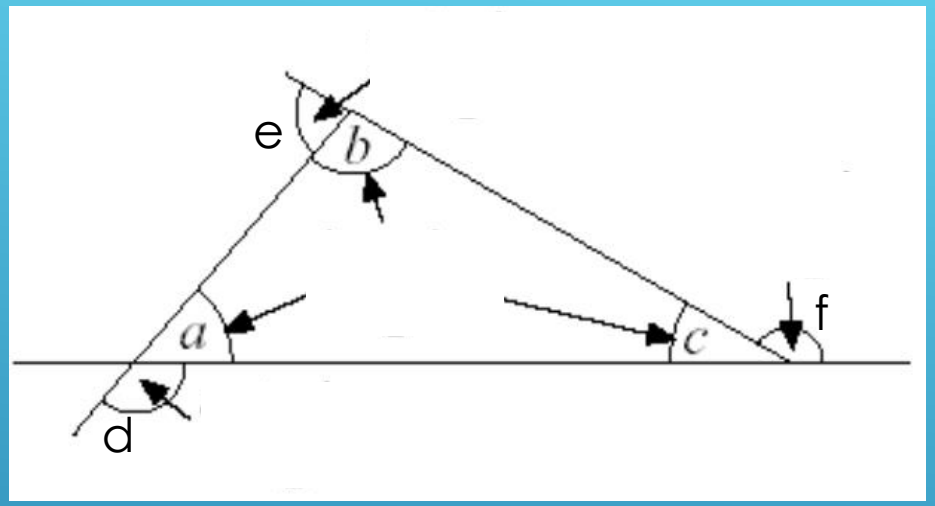
Tuesday, November 11, 2014



1. List the interior angles.
2. List the exterior angles.
3. a + b + c = ?
4. a + d = ?
5. a + b + d + e = ?
6. If a = 65 and e = 100, c = ?

1 2 3 4 5 6 7 8 9 10

WARM UP

HOMEWORK

Packet pages 2-5 through 3-5. All circled problems.

OBJECTIVES…

Use properties of parallel lines and the relationships of their angles to solve problems.

Use properties of the interior and exterior angles of a triangle to solve missing angle problems.

Prove the Triangle Angle Sum Theorem

Geometry Pre-Assessment

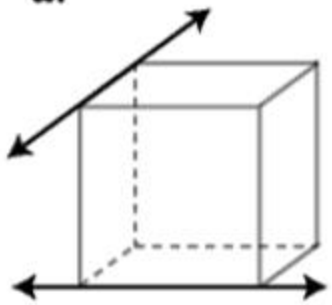
Clear your desk and get out a pencil. You won't need a calculator.

Let's review

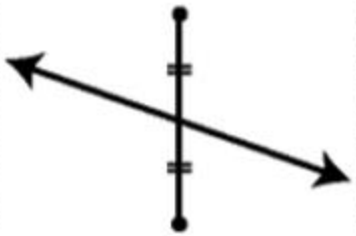
For problems 1 – 8, match the following terms with their corresponding picture.

1. _____ Line AB
2. _____ Linear pair angles
3. _____ Coplanar points
4. _____ Congruent (symbol)
5. _____ Skew lines
6. _____ Complementary angles
7. _____ Segment bisector
8. _____ Angle bisector

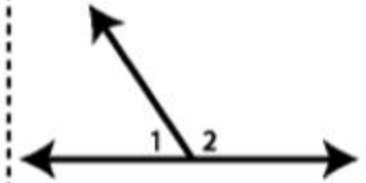
a.



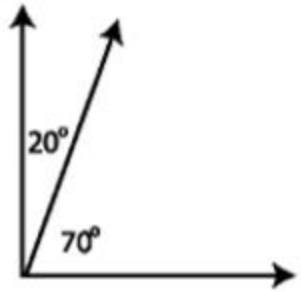
b.



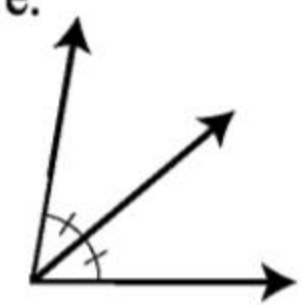
c.



d.

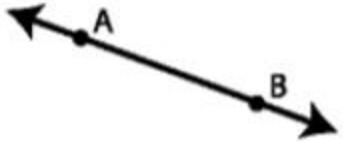


e.

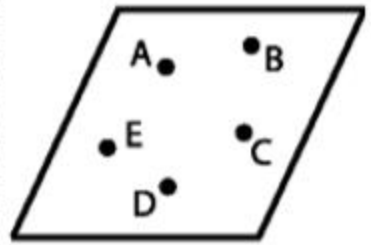


f.

g.



h.



Let's review

9. If T is the midpoint of $\overline{PQ}$, PT = 5x + 3, TQ = 7x – 9, find x, PT, TQ, and PQ. Draw the figure and show all work.

x = _____

PT = _____

TQ = _____

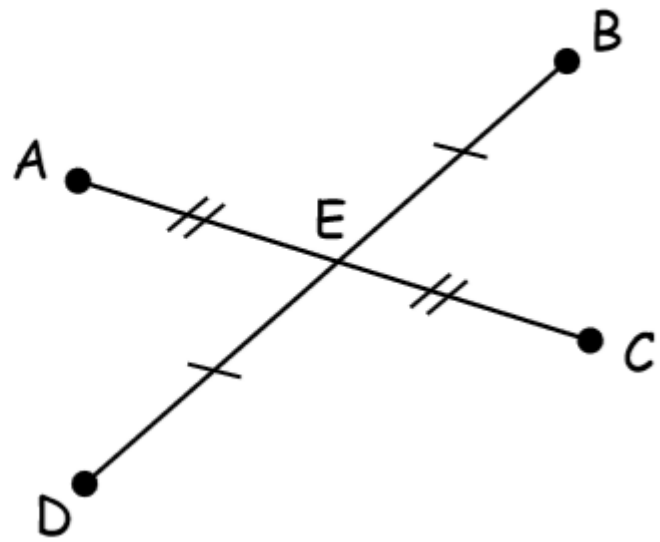
PQ = _____

10. If AE = 12 and AC = 4x – 36, find x, EC, and AC.

x = _____

EC = _____

AC = _____



Let's review

11. If $\overrightarrow{NS}$ bisects $\angle MNO$, $m\angle MNS = 24$, and $m\angle MNO = 4x - 12$, find x and $m\angle MNO$. Draw the figure and show all work.

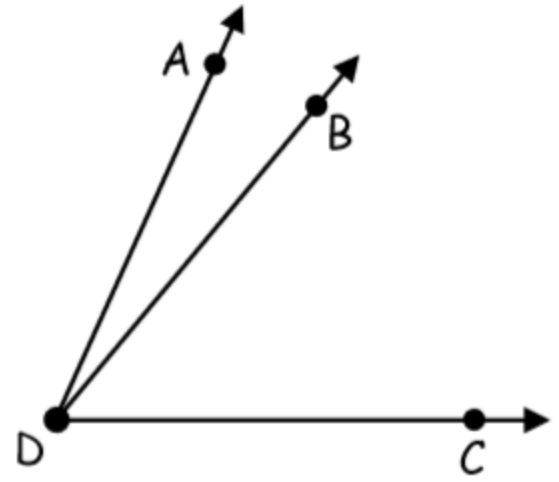
x = _____

$m\angle MNO$ = _____

12. $m\angle ADC = 5x - 20$, $m\angle ADB = x - 4$, $m\angle BDC = x + 5$. Find x and $m\angle ADC$.

X = _____

$m\angle ADC$ = _____

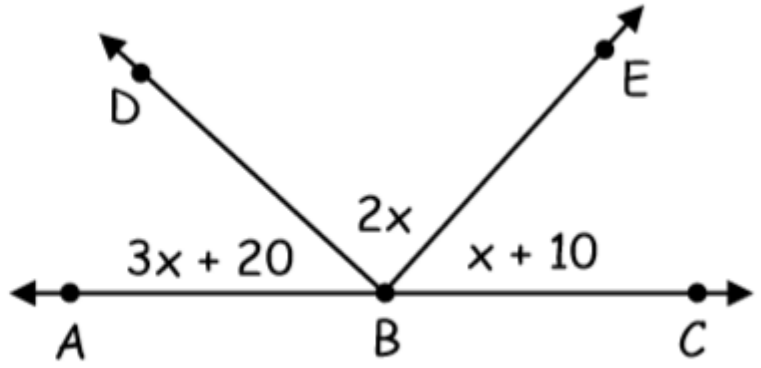


Let's review

13. In the picture to the right, find x and m ∠ ABE.

x = _____

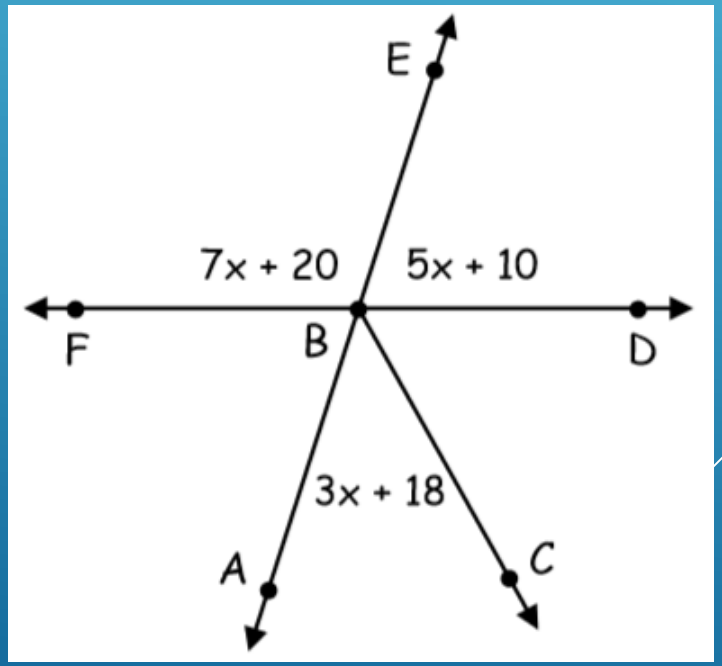
m ∠ ABE = _____



14. In the picture to the right, find x and m ∠ ABC.

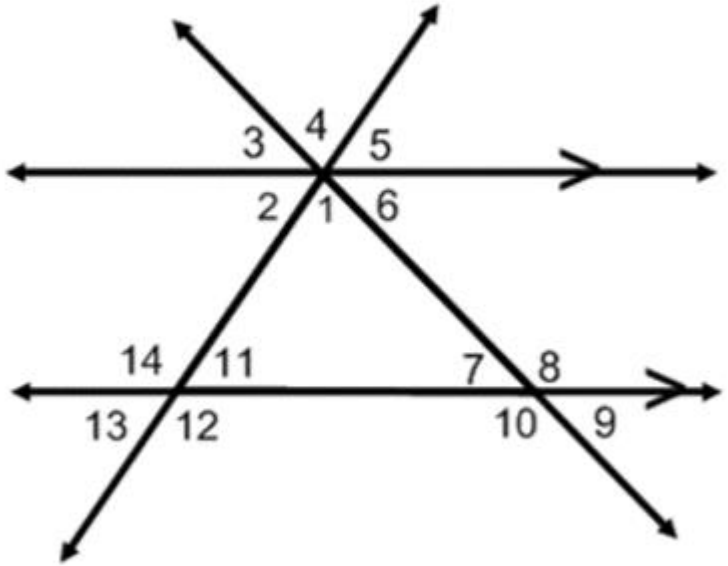
x = _____

m ∠ ABC = _____



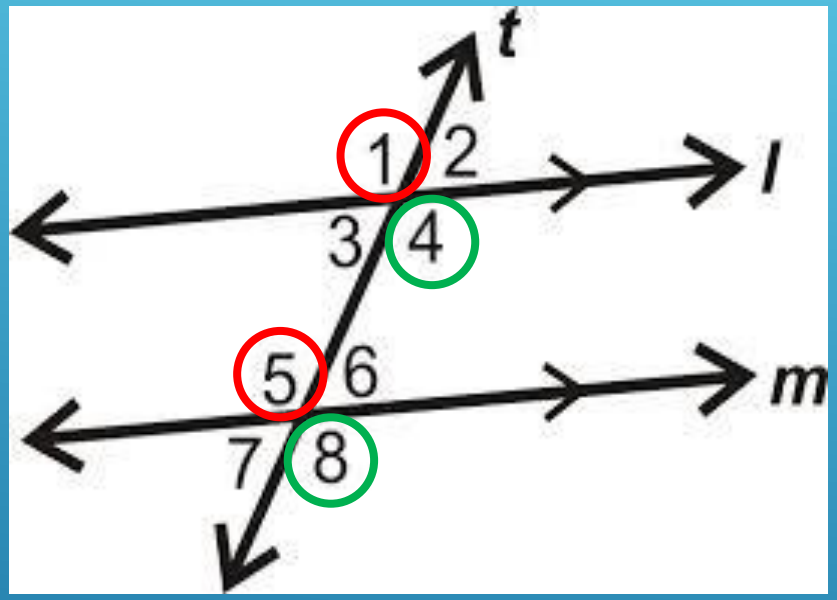
Let's review

15. If the $m\angle 3 = 53°$ and $m\angle 4 = 85°$ find all the angles.



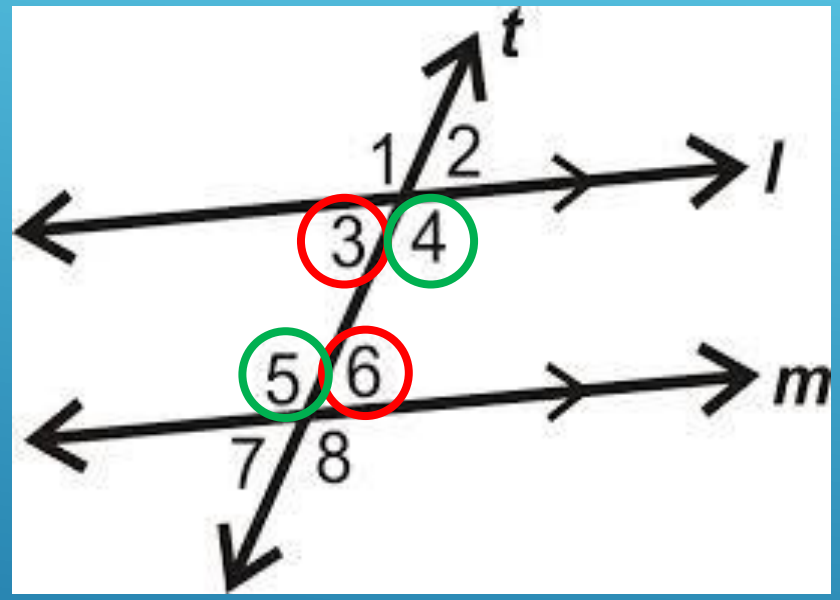
Explain how you determined $m\angle 7$.

More Angles associated with a transversal



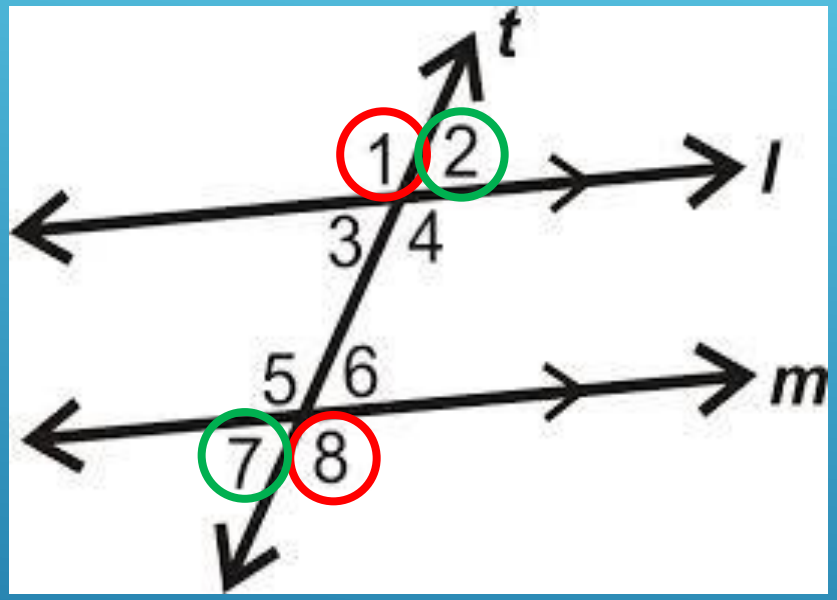
Corresponding Angles

More Angles associated with a transversal



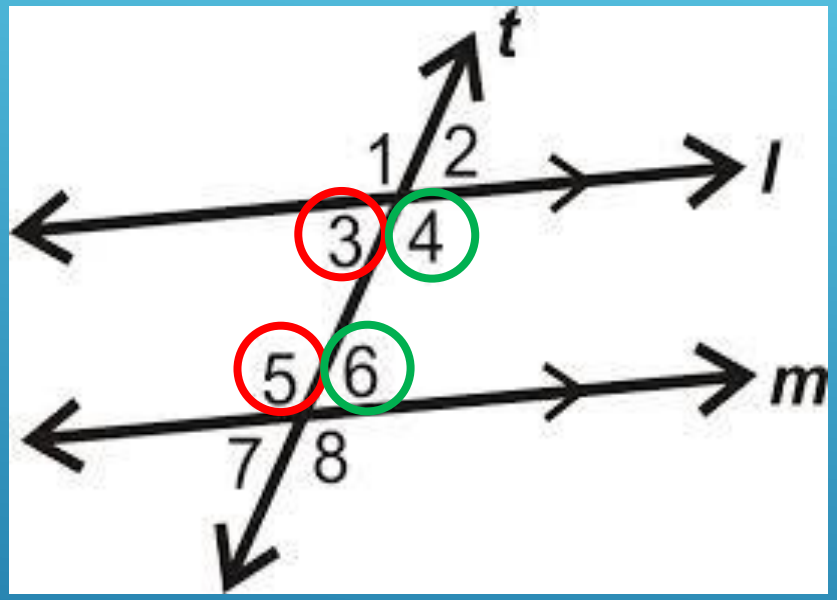
Alternate Interior Angles

More Angles associated with a transversal



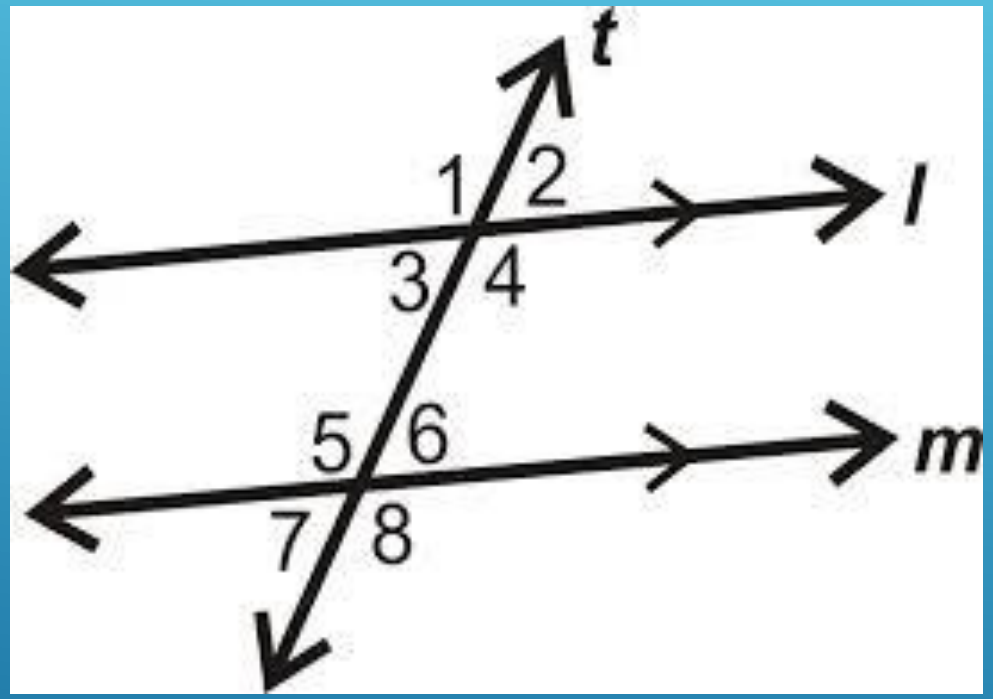
Alternate Exterior Angles

More Angles associated with a transversal



Same Side Interior Angles

Properties of Parallel Lines



Alternate Exterior Angles - **Equal**

Alternate Interior Angles - **Equal**

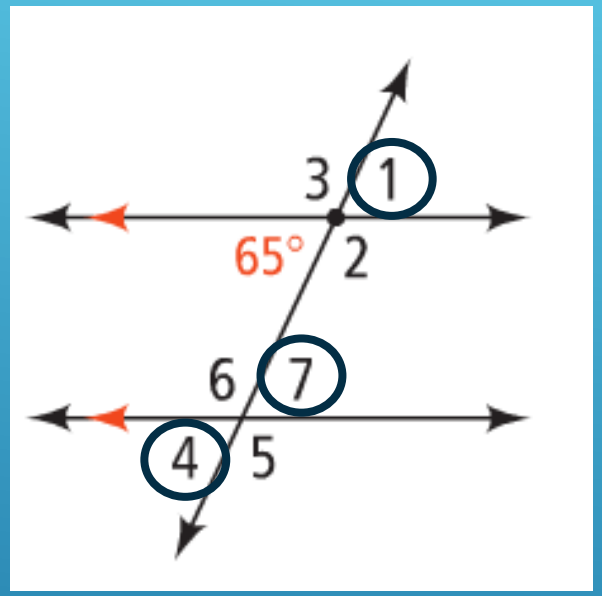
Same Side Interior Angles - **Supplementary**

Corresponding Angles - **Equal**

So why might we care if two lines are parallel?

We use these properties to solve problems.

Which angles have a measure of 65°?

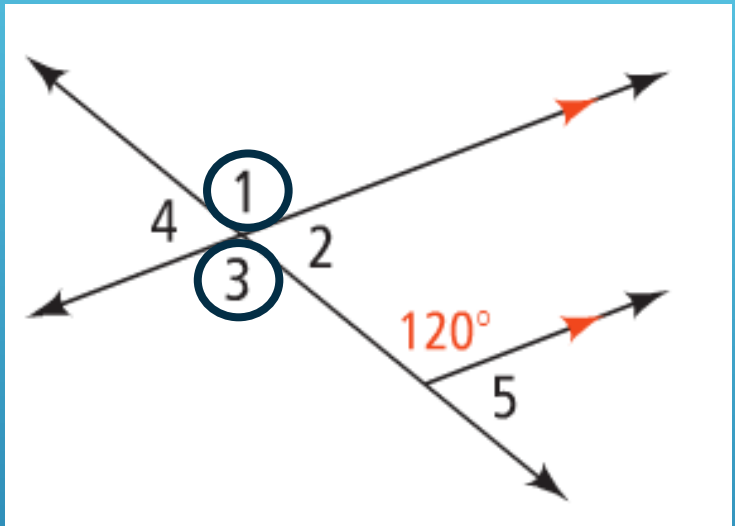


Vertical Angle Theorem

Corresponding Angle Theorem

Vertical Angle Theorem

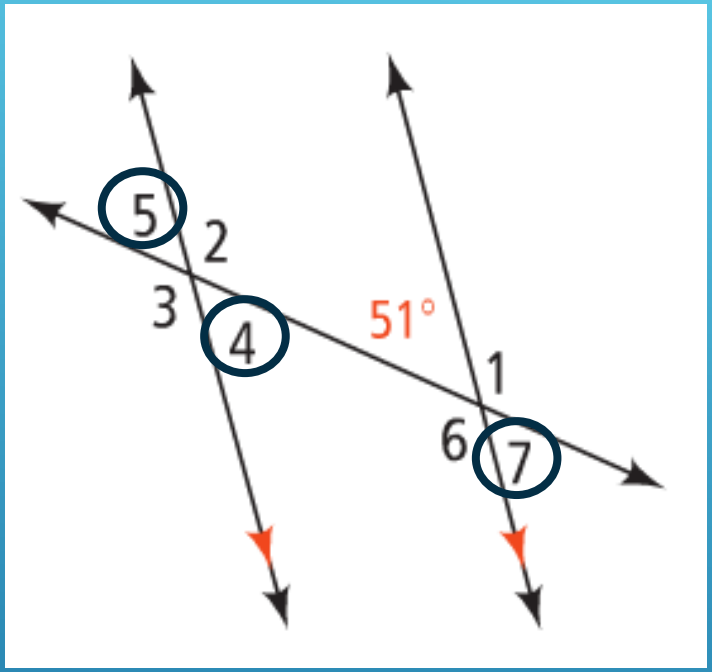
Which angles have a measure of 120°?



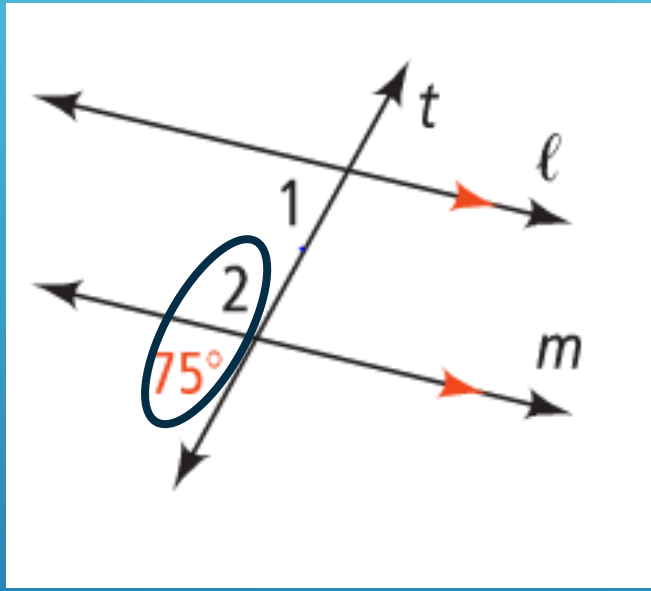
Corresponding Angles

Vertical Angles

Which angles have a measure of 51°?



Find the angle measure of angles 1 and 2.



What do we know about these two angles?

Supplementary

Therefore $m\angle 2 \; is \; equal \; to \; 180° - 75° = 105°$

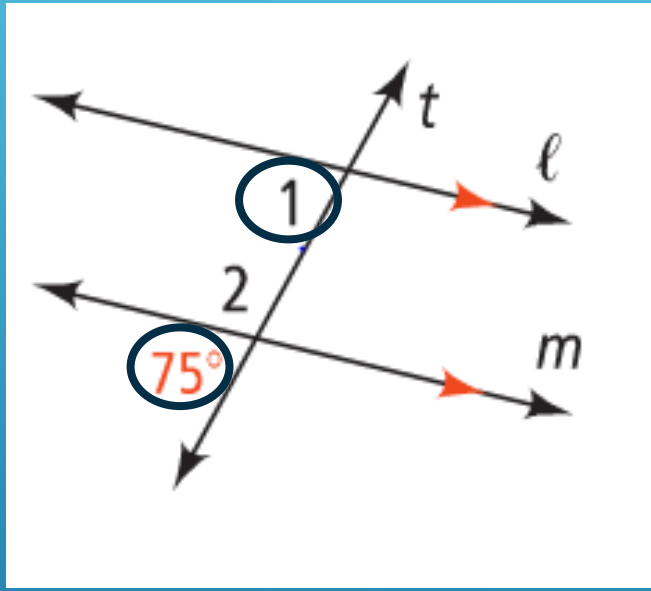
What do we know about angles 1 and 2?

Supplementary

Therefore $m\angle 1 \; is \; equal \; to \; 180° - m\angle 2 = 180° - 105° = 75°$

Find the angle measure of angles 1 and 2.

A slightly different approach…



What do we know about these two angles?

Congruent

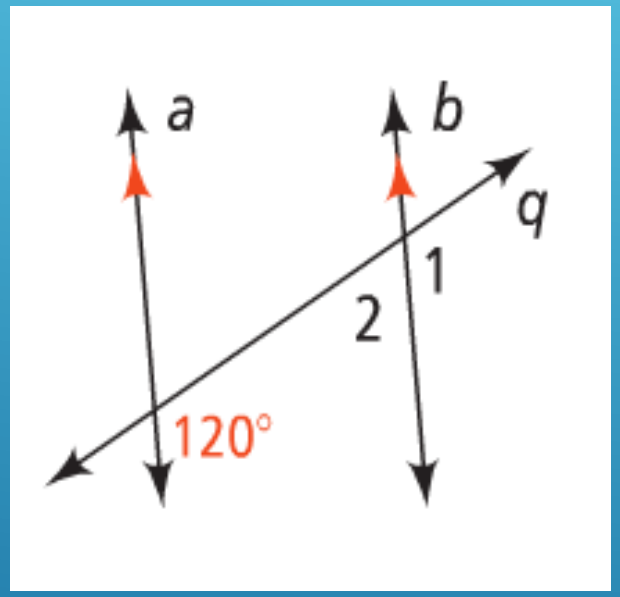
Therefore $m\angle 1 \; is \; equal \; to \; 75°$

What do we know about angles 1 and 2?

Supplementary

Therefore $m\angle 2 \; is \; equal \; to \; 180° - m\angle 1 = 180° - 75° = 105°$

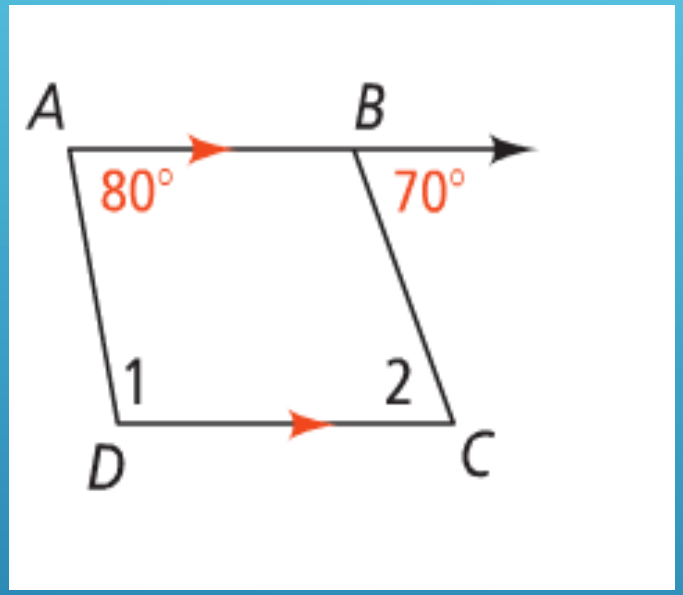
Find the angle measure of angles 1 and 2.



What do we know?

How can we use what we know?

Find the angle measure of angles 1 and 2.

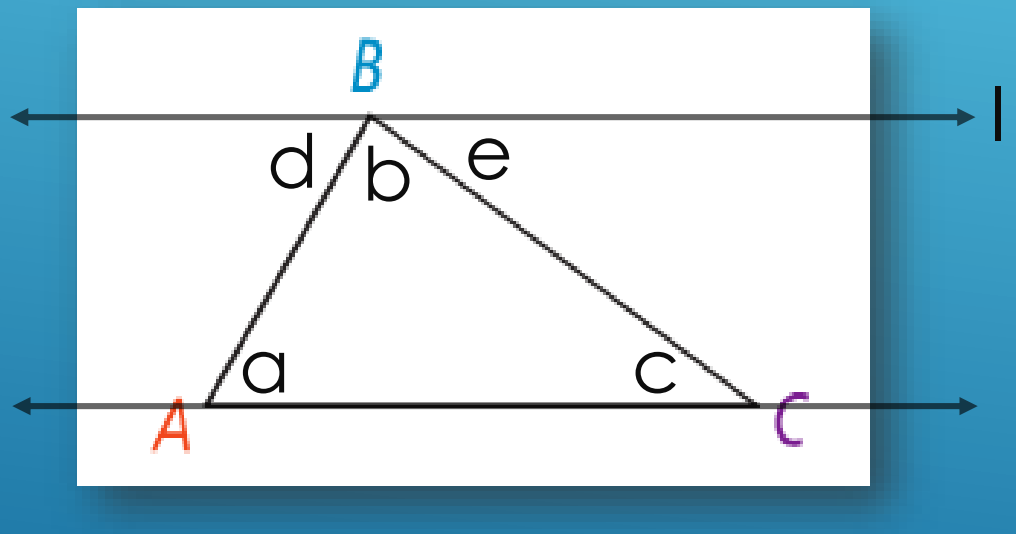


What do we know?

How can we use what we know?

Remember this?

The sum of the interior angles of a triangle is equal to 180°



How do we know?

We need the help of a parallel line.

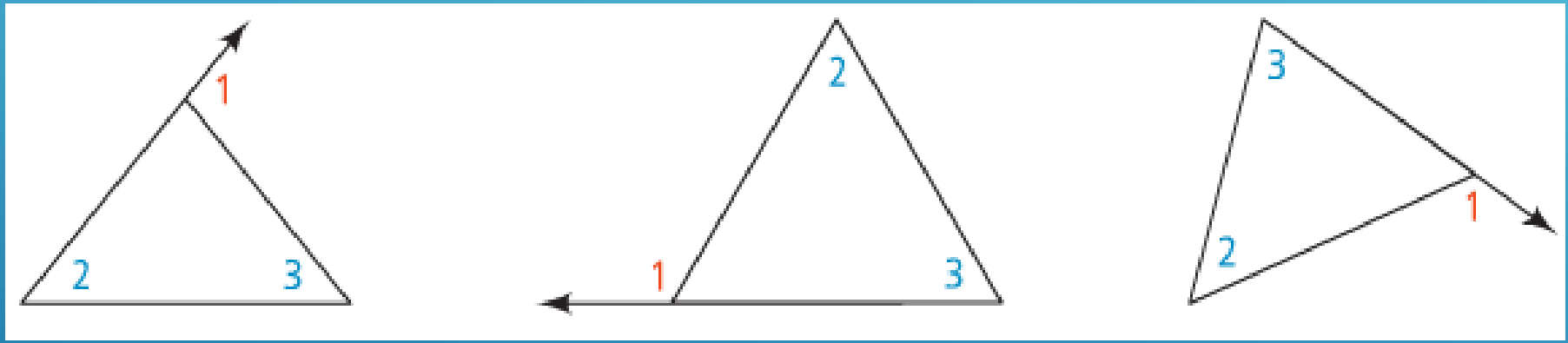
Let the line l be a line parallel to the base of the triangle ABC

$line\ l \parallel line\ \overline{AC}$	given
$\angle e = \angle c$	Alternate interior angles
$\angle d = \angle a$	Alternate interior angles
$\angle b = \angle b$	Reflexive Property
$\angle d + \angle b + \angle e = 180$	Angle addition Property
$\angle a + \angle b + \angle c = 180$	Substitution Property

More definitions

Exterior angle of a polygon: angle formed by a side and an extension of an adjacent side.

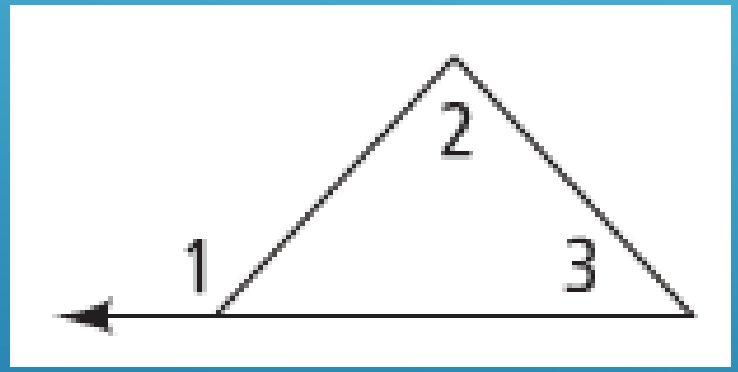
Remote interior angles: for each exterior angle of a triangle, the two non-adjacent interior angles



Which leads us to…

Triangle Exterior Angle Theorem

The measure of each exterior angle of a triangle is equal to the sum of the measures of its two remote interior angles.

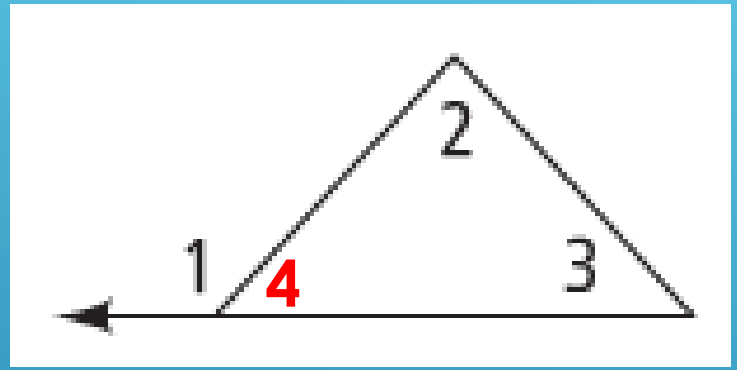


$$m\angle 1 = m\angle 2 + m\angle 3$$

Use what you know about interior angles and supplemental angles to prove this theorem.

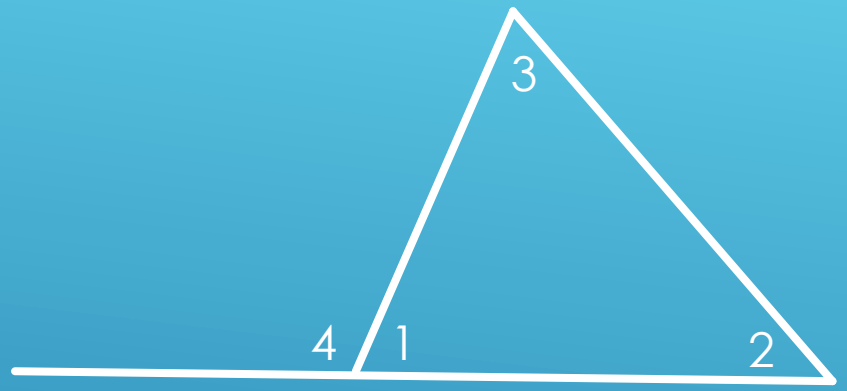
Triangle Exterior Angle Theorem

Prove $m\angle 1 = m\angle 2 + m\angle 3$



$m\angle 1 + m\angle 4 = 180$	definition of a linear pair
$m\angle 2 + m\angle 3 + m\angle 4 = 180$	sum of interior angles of a triangle
$m\angle 2 + m\angle 3 + m\angle 4 = m\angle 1 + m\angle 4$	transitive property
$m\angle 2 + m\angle 3 = m\angle 1$	subtraction property

Find the missing angle measures given…



1. $m\angle 2 = 50° \; and \; m\angle 3 = 80°$

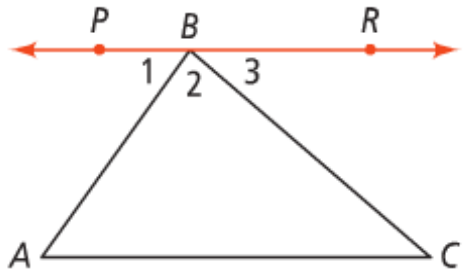
2. $m\angle 4 = 100° \; and \; m\angle 2 = 50°$

3. $m\angle 1 = 75° \; and \; m\angle 3 = 20°$

Proof Proof of Theorem 3-10: Triangle Angle-Sum Theorem

Given: $\triangle ABC$

Prove: $m\angle A + m\angle 2 + m\angle C = 180$

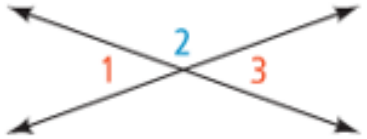


Statements	Reasons
1) Draw $\overleftrightarrow{PR}$ through B, parallel to $\overline{AC}$.	**1)** Parallel Postulate
2) $\angle PBC$ and $\angle 3$ are supplementary.	**2)** $\measuredangle$s that form a linear pair are suppl.
3) $m\angle PBC + m\angle 3 = 180$	**3)** Definition of suppl. $\measuredangle$s
4) $m\angle PBC = m\angle 1 + m\angle 2$	**4)** Angle Addition Postulate
5) $m\angle 1 + m\angle 2 + m\angle 3 = 180$	**5)** Substitution Property
6) $\angle 1 \cong \angle A$ and $\angle 3 \cong \angle C$	**6)** If lines are $\parallel$, then alternate interior $\measuredangle$s are $\cong$.
7) $m\angle 1 = m\angle A$ and $m\angle 3 = m\angle C$	**7)** Congruent $\measuredangle$s have equal measure.
8) $m\angle A + m\angle 2 + m\angle C = 180$	**8)** Substitution Property

Proof of Theorem 2-1: Vertical Angles Theorem

Given: $\angle 1$ and $\angle 3$ are vertical angles.

Prove: $\angle 1 \cong \angle 3$



Statements	Reasons
1) $\angle 1$ and $\angle 3$ are vertical angles.	1) Given
2) $\angle 1$ and $\angle 2$ are supplementary. $\angle 2$ and $\angle 3$ are supplementary.	2) $\measuredangle$s that form a linear pair are supplementary.
3) $m\angle 1 + m\angle 2 = 180$ $m\angle 2 + m\angle 3 = 180$	3) The sum of the measures of supplementary $\measuredangle$s is 180.
4) $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	4) Transitive Property of Equality
5) $m\angle 1 = m\angle 3$	5) Subtraction Property of Equality
6) $\angle 1 \cong \angle 3$	6) $\measuredangle$s with the same measure are $\cong$.