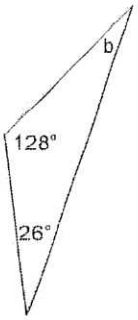
Pre-Algebra

Name_____ ID: 1

Date_____ Period____

Find the measure of angle b.

1)



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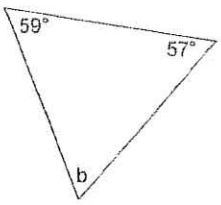

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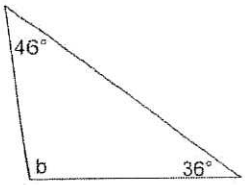

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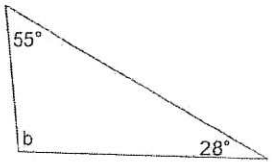

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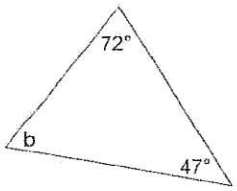

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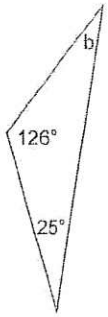

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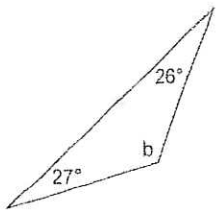

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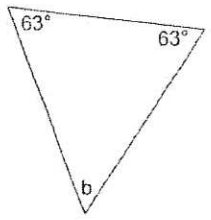

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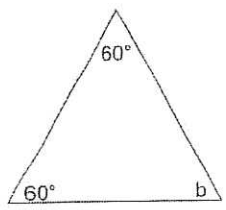

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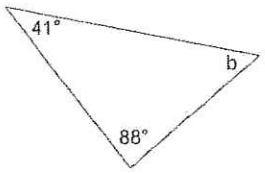

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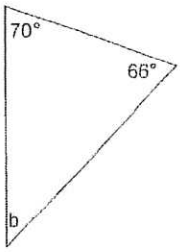

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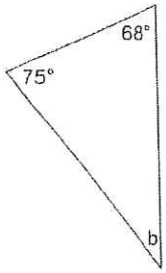

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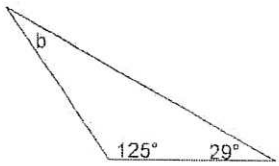

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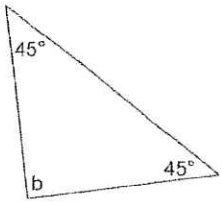

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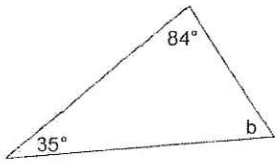

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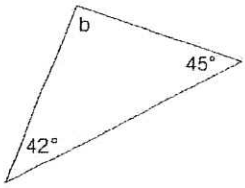

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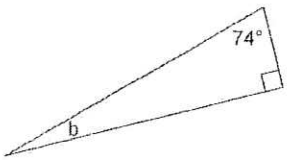

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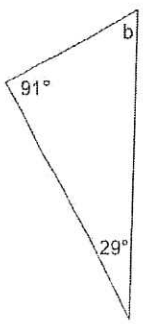


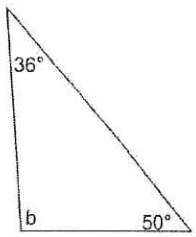
20)

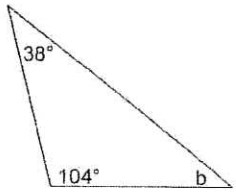
Pre-Algebra

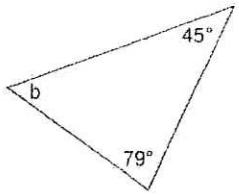
Name_____ ID: 1

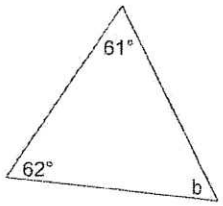
Date_____ Period____

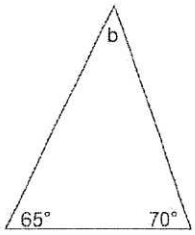
Find the measure of angle b.

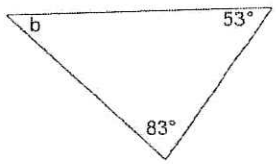
1) 

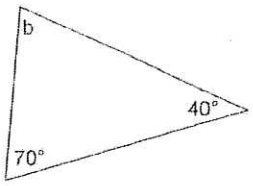
2) 

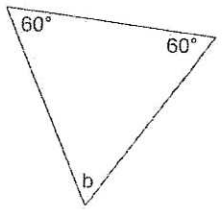
3) 

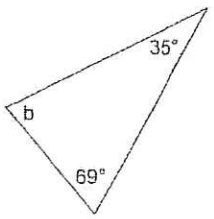
4) 

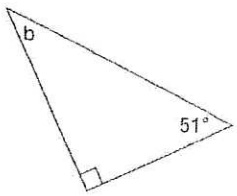
5) 

6) 

7) 

8) 

9) 

10) 

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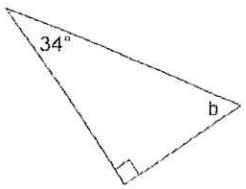

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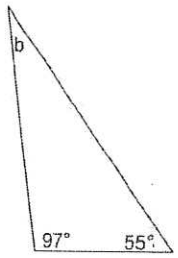

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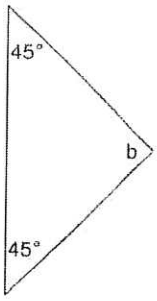

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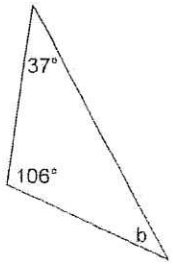

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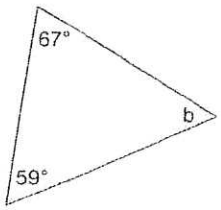

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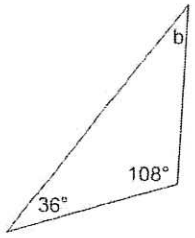

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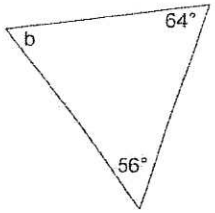

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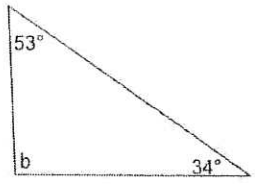

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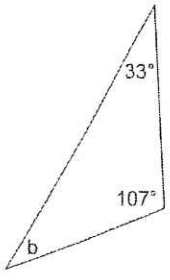

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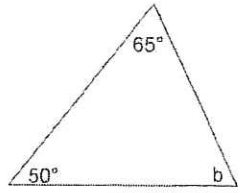


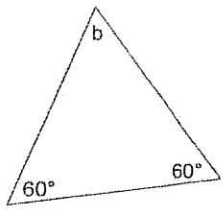
Pre-Algebra

Name_____ ID: 1

Date_____ Period____

Find the measure of angle b.

1)



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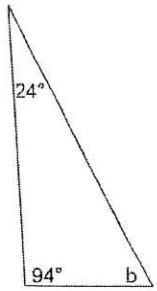

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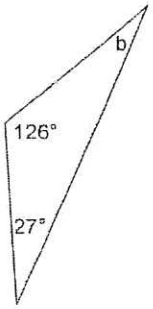

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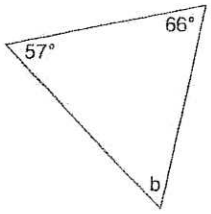

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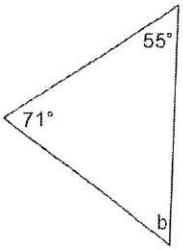

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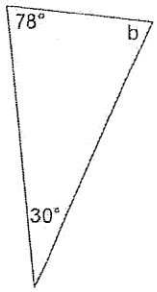

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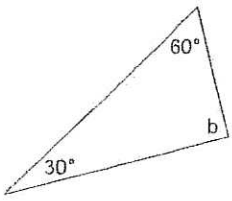

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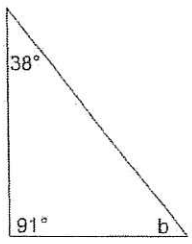

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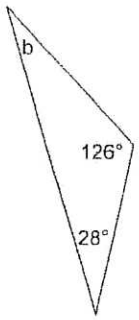

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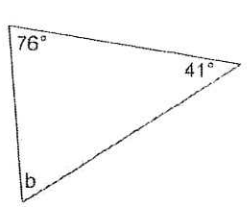

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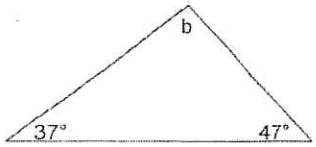

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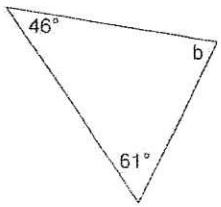

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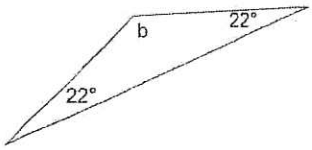

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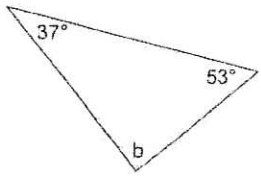

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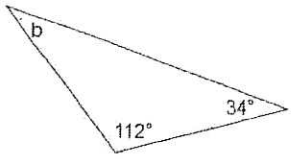

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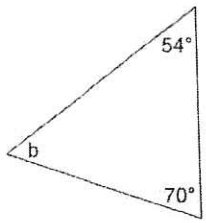

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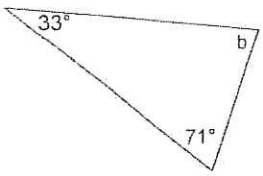

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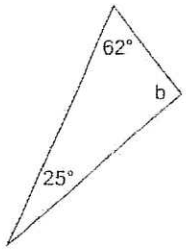

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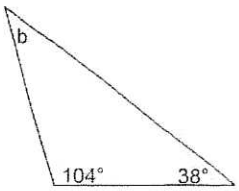

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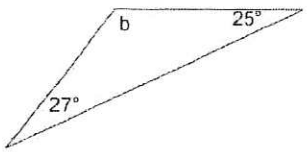


6

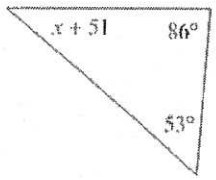
Geometry

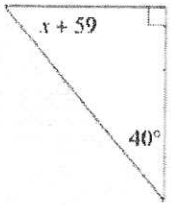
Name _____ ID: 1

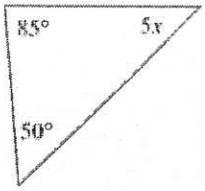
Assignment

Date _____ Period ____

Solve for x.

1) 

2) 

3) 

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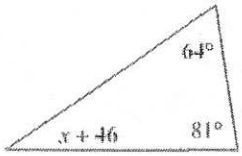
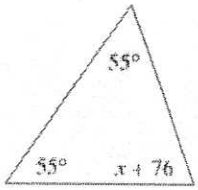
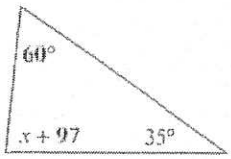
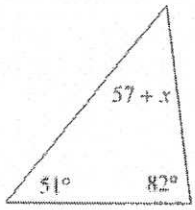
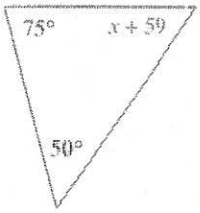
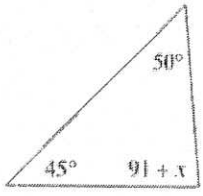
5) 

6) 

7) 

8) 

9) 

10) 

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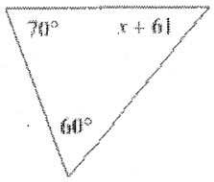

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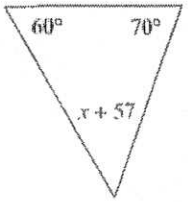

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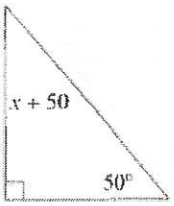

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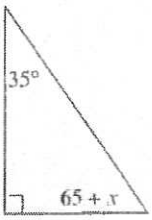

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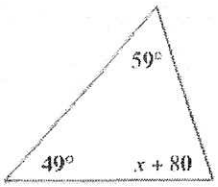

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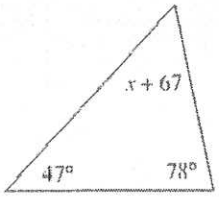

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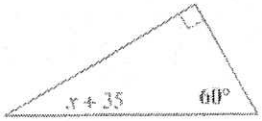

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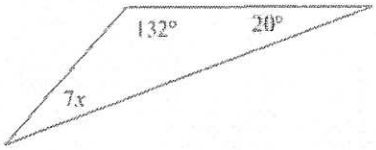

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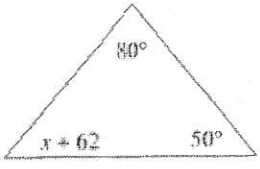

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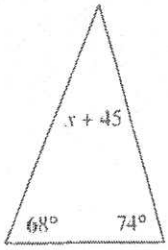


8

Geometry

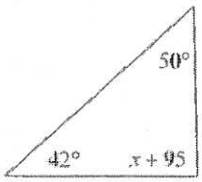
Name _____ ID: 1

Assignment

Date _____ Period ____

Solve for x.

1)



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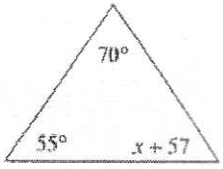

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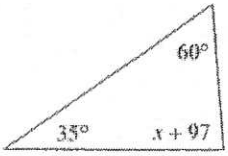

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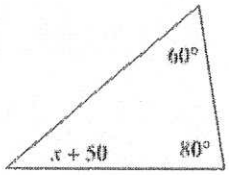

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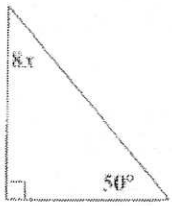

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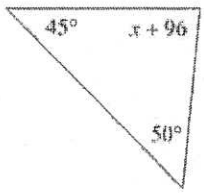

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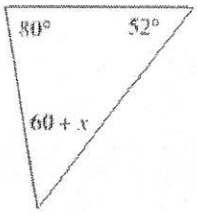

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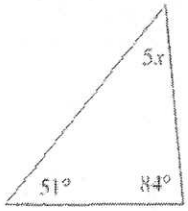

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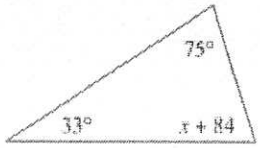

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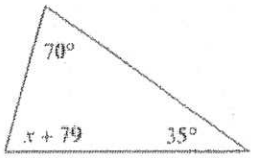
11)



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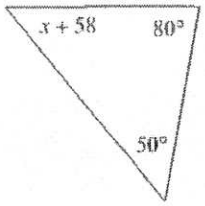

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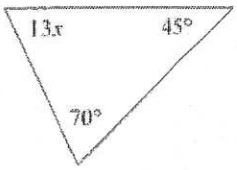

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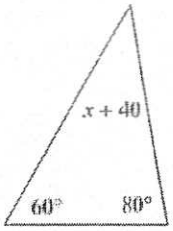

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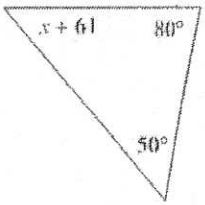

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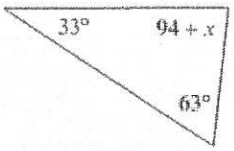

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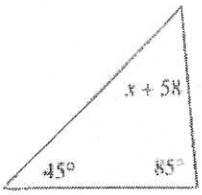

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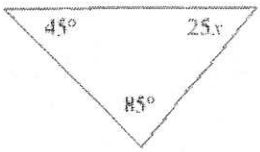

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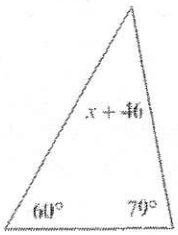


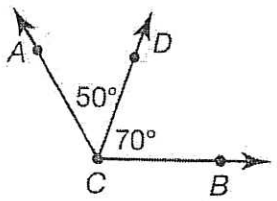
Angle Relationships

1 GETTING THE IDEA

Adjacent angles share a common vertex and a common ray. Adjacent angles do not overlap.

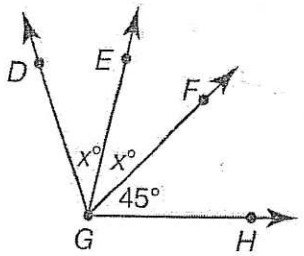
Angles *ACD* and *DCB* are adjacent angles. The measure of $\angle ACB$ is equal to the sum of the measures of the adjacent angles.

So, $m\angle ACB = 50° + 70° = 120°$



Example 1

The measure of $\angle DGH$ is 109°. Find $m\angle DGE$.

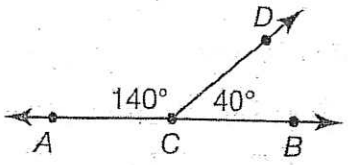


Strategy Use what you know about adjacent angles to write and solve an equation for x.

Step 1 Write an equation.

Step 2 Solve the equation for x.

Two angles are **supplementary angles** if the sum of their measures is 180°. Adjacent supplementary angles form a straight line.



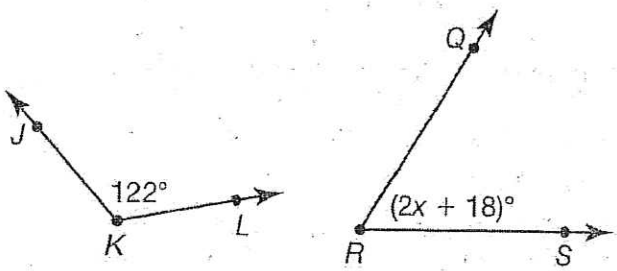
Angles *ACD* and *DCB* are supplementary angles.

$m\angle ACD + m\angle DCB = 180°$

Angles do not need to be adjacent in order to be supplementary.

Example 2

Angles *JKL* and *QRS* are supplementary. Find the value of x and the measure of $\angle QRS$.



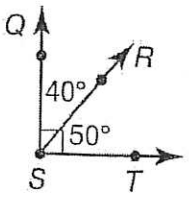
Strategy Use what you know about supplementary angles to write and solve an equation for x.

Step 1 Write an equation.

Step 2 Solve the equation for x.

Step 3 Find the measure of $\angle QRS$.

A pair of angles whose measures have a sum of 90° are **complementary angles**. Adjacent, complementary angles form a right angle.



Angles QSR and RST are complementary angles.

$m\angle QSR + m\angle RST = 40° + 50° = 90°$

Complementary angles are not always adjacent.

Example 3

Two angles are complementary angles. The measure of the larger angle is 3 times the measure of the smaller angle. What is the measure of each angle?

Strategy Use what you know about complementary angles to write and solve an equation.

Step 1 Write expressions to represent the measures of the angles.

Step 2 Write an equation.

Step 3 Solve the equation for x.

Step 4 Find the measure of each angle.

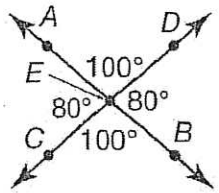
Vertical angles are formed by intersecting lines and are opposite one another. They share a vertex, which is their only common point. Vertical angles have the same measure.

Angles *AED* and *CEB* are vertical angles.

$m\angle AED = m\angle CEB$

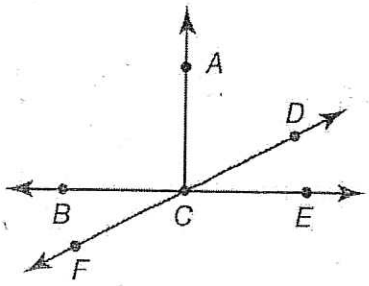
Angles *AEC* and *DEB* are vertical angles.

$m\angle AEC = m\angle DEB$



Example 4

The measure of $\angle ACD$ is $(10x + 3)°$ and $m\angle BCF = 27°$. Angles *ACD* and *DCE* are complementary. What is the value of x and the measure of $\angle ACD$?



Strategy Use what you know about angles to write and solve an equation.

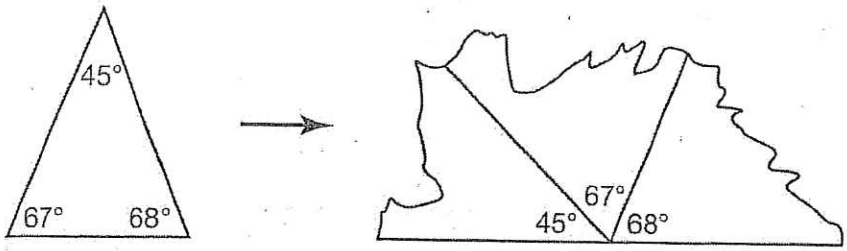
Step 1 Identify the relationships between the angles.

Step 2 Write an equation to find the value of x.

Step 3 Solve the equation for x.

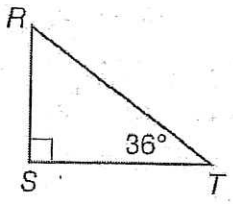
Step 4 Find the measure of $\angle ACD$.

The drawing below shows that if you place the three **interior angles** of a triangle adjacent to each other, they form a straight line. The sum of the measures of the adjacent angles is equal to 180°, so the sum of the measures of the interior angles of a triangle is 180°.



Example 5

$\triangle RST$ is a right triangle. Find $m\angle R$.



Strategy Write and solve an equation.

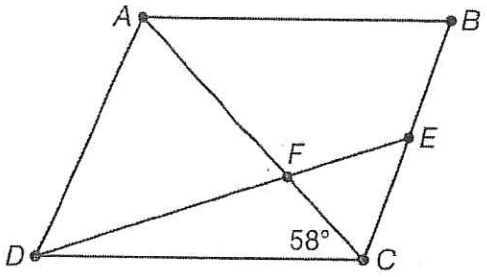
Step 1 Identify the measures of the given angles.

Step 2 Write an equation. Substitute the measures of the given angles.

Step 3 Solve the equation for $m\angle R$.

2 COACHED EXAMPLE

An architect designs two walking paths across a flower garden. The paths are shown by $\overline{AC}$ and $\overline{DE}$. In her design, the measure of $\angle ECF$ is the same as the measure of $\angle EFC$. She draws $\angle DCF$ so that it measures 58°. She draws $\angle DCE$ so that it measures 110°. What is the measure of $\angle AFD$ in her design?



Angles *DCF* and *ECF* are _____ angles.

Write an equation to represent the sum of the measures of their angles. Then solve for x.

$m\angle DCF + m\angle ECF = m\angle$_____

_____ $+ x = 110$

$x =$ _____

So, $m\angle ECF =$ _____°.

Since $m\angle ECF = m\angle EFC$, $m\angle EFC =$ _____°.

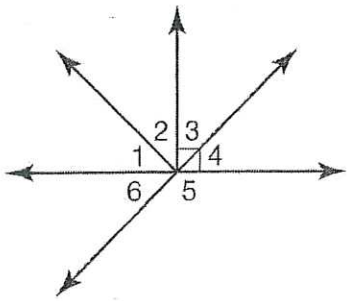
Angles *EFC* and *AFD* are _____ angles, so their measures are _____.

Therefore, $m\angle AFD =$ _____°.

The measure of $\angle AFD$ is _____° in her design.

3 LESSON PRACTICE

1. Which statement is **not** true?



A. Angles 1 and 2 are adjacent angles.

B. Angles 3 and 4 are complementary angles.

C. $m\angle 5 + m\angle 6 = 180°$

D. Angles 3 and 6 are vertical angles.

2. Two angles are complementary. The measure of the larger angle is twice the measure of the smaller angle. What is the measure of the larger angle?

A. 30°

B. 60°

C. 90°

D. 120°

3. In $\triangle ABC$, $m\angle A = 90°$ and $m\angle C = 22°$. What is the measure of $\angle B$?

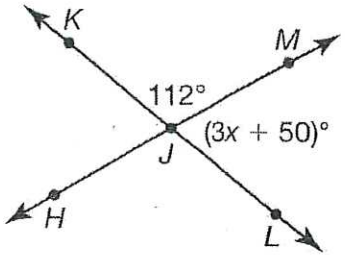
A. 22°

B. 54°

C. 68°

D. 112°

Use the figure below for questions 4 and 5.



4. What is the measure of $\angle HJL$?

A. 18°

B. 68°

C. 72°

D. 112°

5. What is the value of x?

A. 6

B. 9

C. 18

D. 68

6. Two angles are supplementary. The measure of the larger angle is 4 times the measure of the smaller angle. What is the measure of the smaller angle?

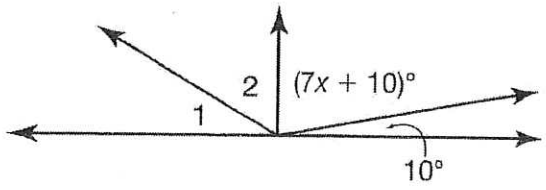
A. 18°

B. 36°

C. 45°

D. 144°

7 Angles 1 and 2 are complementary angles. What is the value of x?



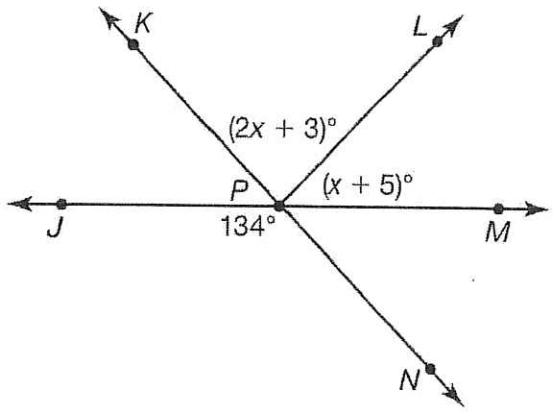
A. 10

B. 11.4

C. 20

D. 22.6

8 Angles JPK and JPN are supplementary. What is the value of x?



A. 66.5

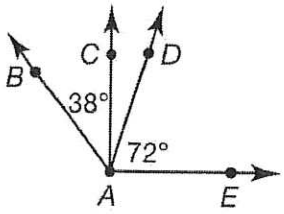
B. 63

C. 46

D. 42

Use the figure below for questions 9 and 10.

Angles CAD and DAE are complementary.



9 What is the measure of $\angle CAD$?

A. 12°

B. 18°

C. 34°

D. 38°

10 What is the measure of $\angle BAE$?

A. 34°

B. 110°

C. 112°

D. 128°

11 In $\triangle ABC$, $m\angle A = 55°$ and $m\angle B = 72°$. What is the measure of $\angle C$?

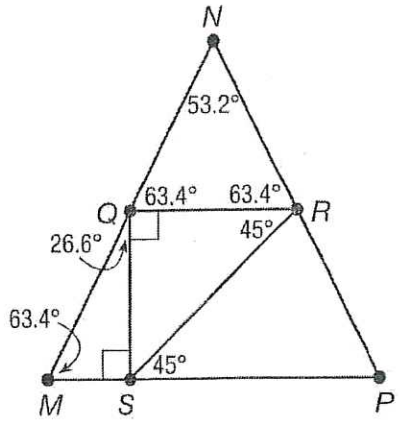
A. 35°

B. 37°

C. 53°

D. 127°

Use the figure below for questions 12–14.



12 Which term accurately describes $\angle NQR$ and $\angle NMP$?

A. adjacent angles
B. complementary angles
C. supplementary angles
D. congruent angles

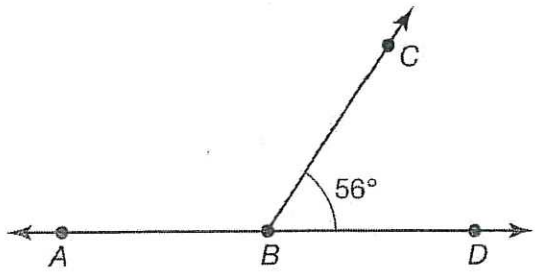
13 Which term accurately describes $\angle MQS$ and $\angle QMS$?

A. complementary angles
B. adjacent angles
C. congruent angles
D. supplementary angles

14 What is the measure of $\angle SRP$?

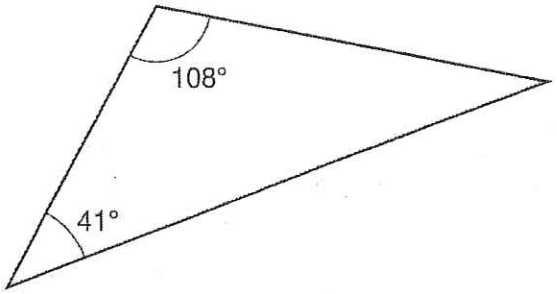
A. 45°
B. 71.6°
C. 82.6°
D. 90°

15 What is the measure of $\angle ABC$?



A. 124°
B. 112°
C. 62°
D. 56°

16 What is the measure of the unlabeled angle?

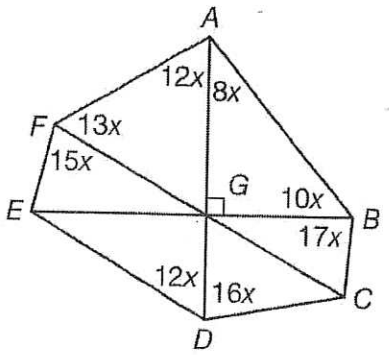


A. 21°
B. 31°
C. 41°
D. 108°

17 Angles ABC and DBE are vertical angles. If $m\angle ABC = 52°$, what is $m\angle DBE$?

A. 38°
B. 52°
C. 128°
D. 180°

18 Polygon *ABCDEF* is shown below. $\overline{FC}$, $\overline{AD}$, and $\overline{EB}$ are line segments.

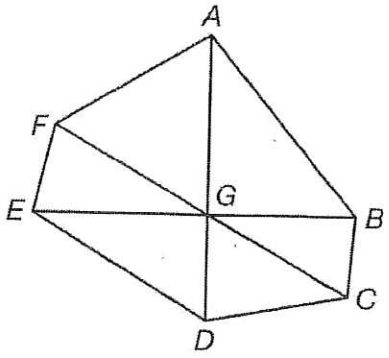


Part A

What is the value of x? Explain or show all your work.

Part B

Write the measure of each angle in polygon *ABCDEF* in the figure below.



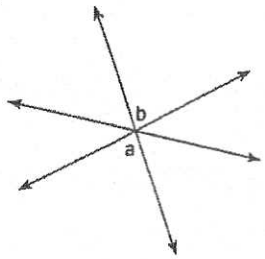
Pre-Algebra

Name_____ ID: 1

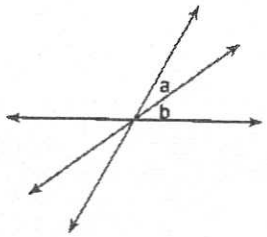
Date_____ Period____

Name the relationship: complementary, supplementary, vertical, or adjacent.

1)



2)



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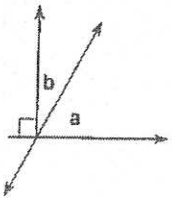

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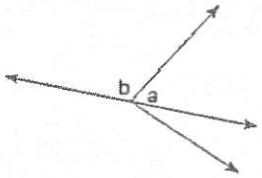
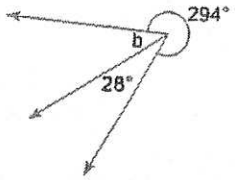


Find the measure of angle b.

5)



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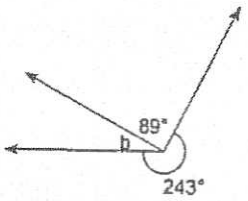

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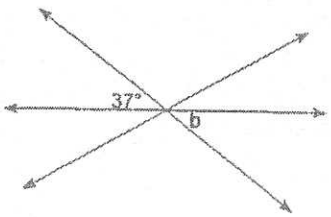

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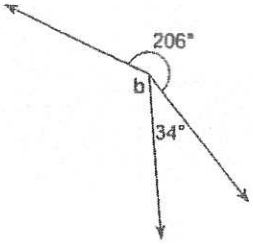
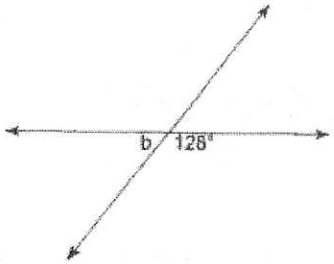
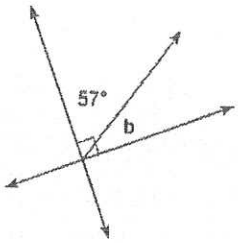


21

9)

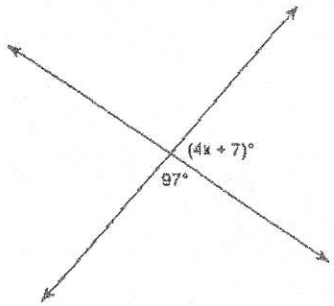


10)



Find the value of x.

11)



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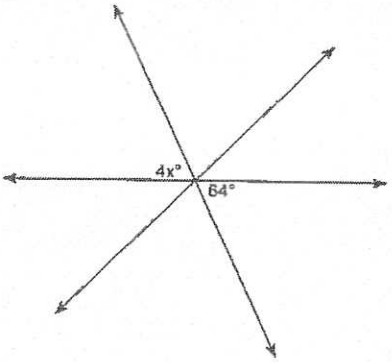
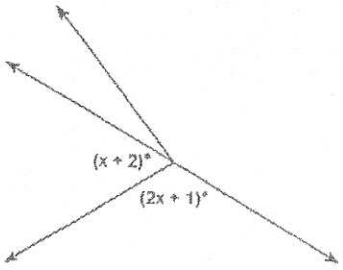


13)



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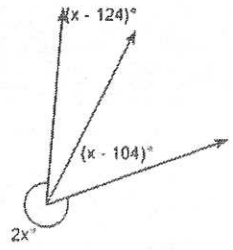

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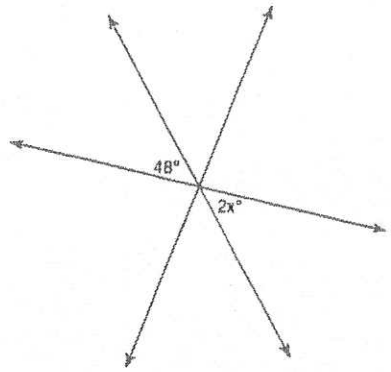

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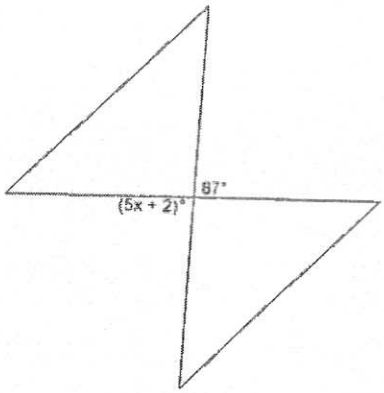

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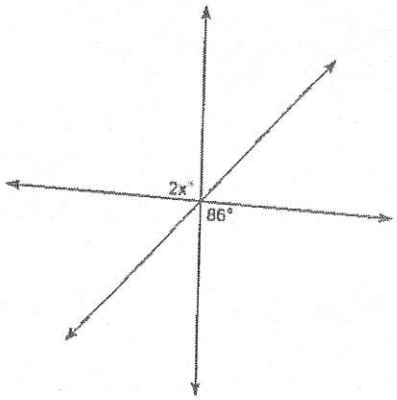

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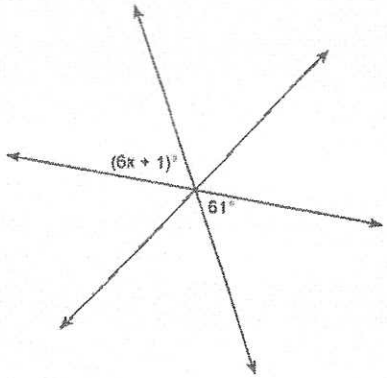

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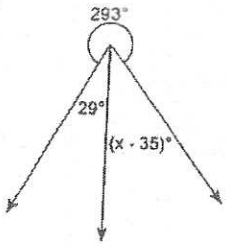

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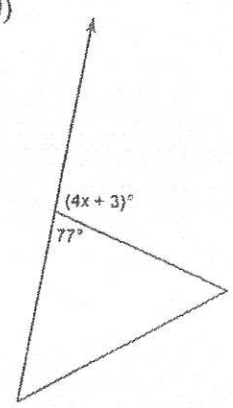


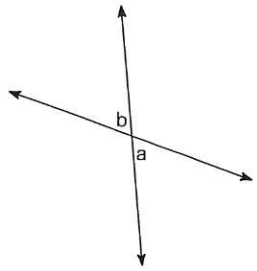
Geometry Name_____ ID: 1

Assignment

Date_____ Period____

Name the relationship: complementary, vertical, or adjacent.

1)



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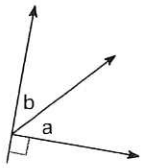
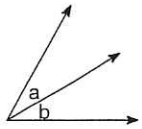
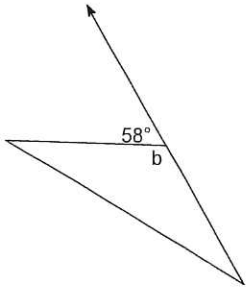


3)



Find the measure of angle b.

4)



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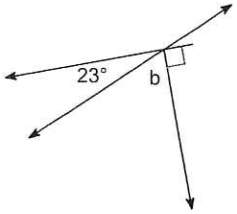

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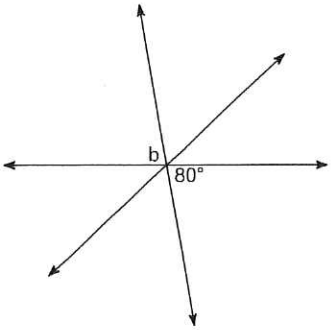

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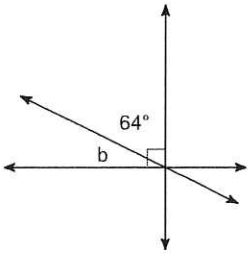

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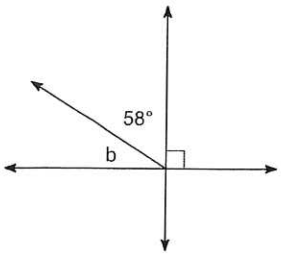

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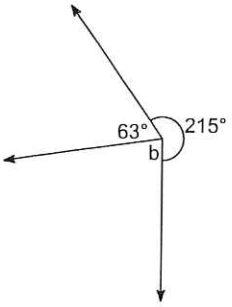

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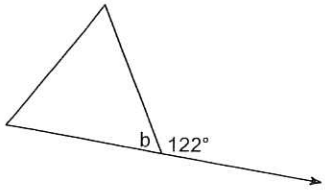

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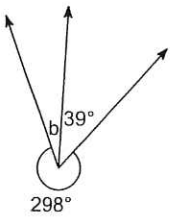
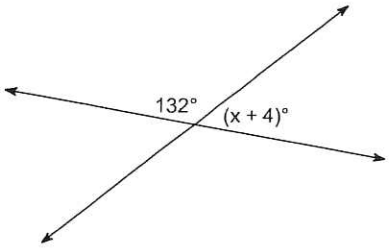


Find the value of x. Find the measure of the missing angles.

12)



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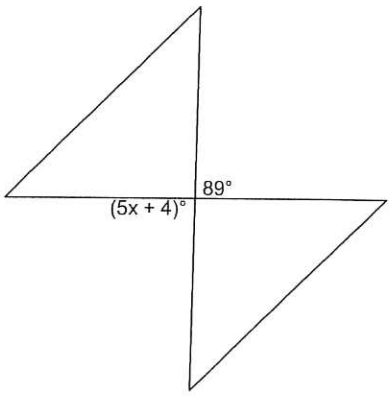

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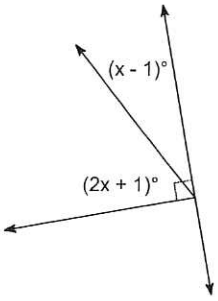

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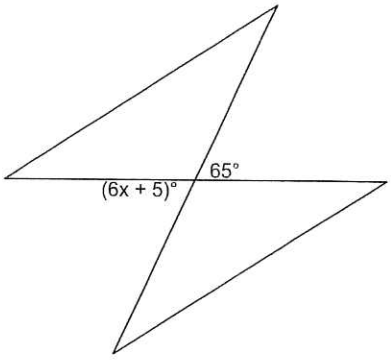

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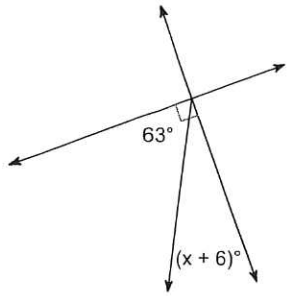

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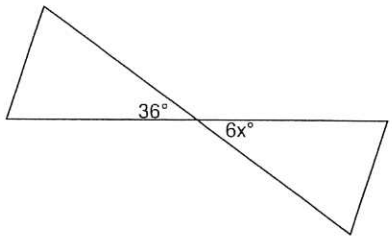

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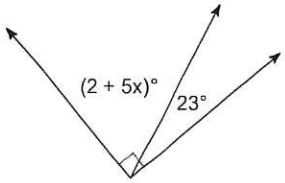

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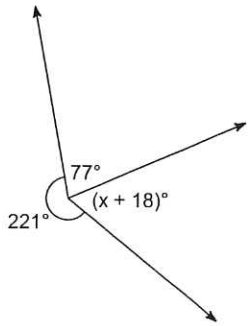
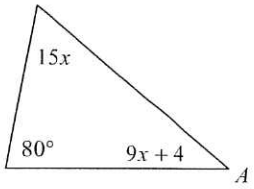


Find the measure of angle A.

20)



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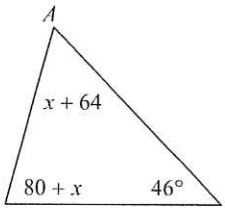

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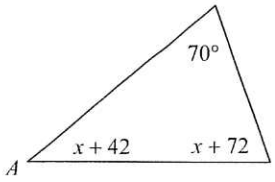

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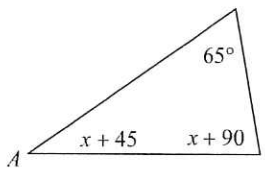

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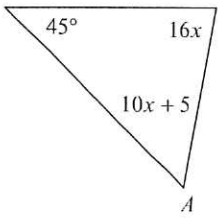

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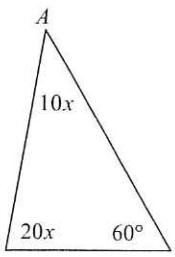
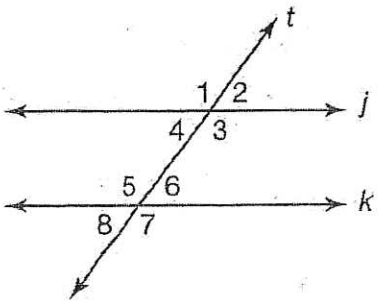


Angles Formed by Transversals of Parallel Lines

1 GETTING THE IDEA

The figure below shows two **parallel lines**, $j \parallel k$. The parallel lines are intersected by a **transversal**, t. A transversal is a line that intersects two or more lines. Special pairs of angles are formed when a transversal intersects two parallel lines.

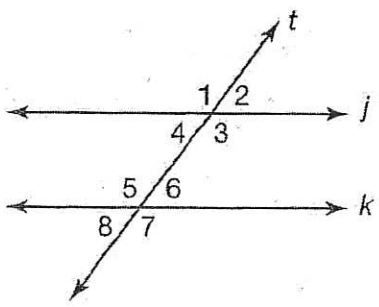


Corresponding Angles

Corresponding angles are on the same side of the transversal and on the same side of the parallel lines. In other words, corresponding angles lie in the same position relative to the points of intersection. Corresponding angles have the same measure.

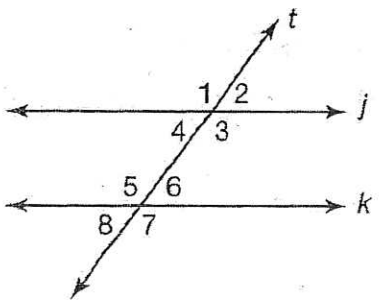
Alternate Exterior Angles

Alternate exterior angles are outside the parallel lines and on opposite sides of the transversal. Alternate exterior angles have the same measure.



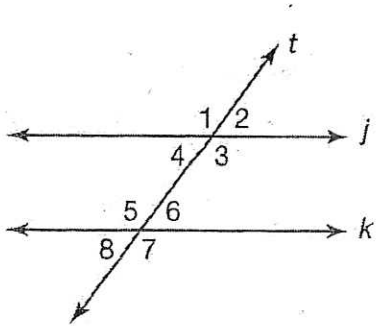
Alternate Interior Angles

Alternate interior angles are on the inside of the parallel lines and are on opposite sides of the transversal. Alternate interior angles have the same measure.



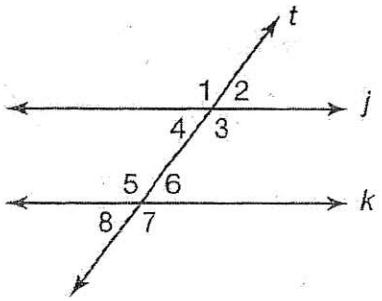
Vertical Angles

Vertical angles are opposite angles formed by two intersecting lines. Vertical angles have the same measure.



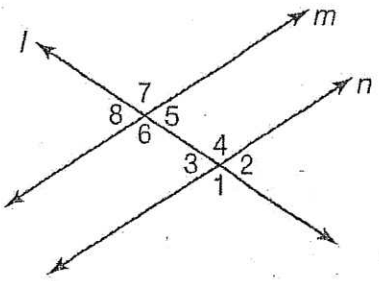
Same-Side Interior Angles

Same-side interior angles are between parallel lines and on the same side of the transversal. Same-side interior angles are supplementary angles. The measures of supplementary angles add to 180°.



Example 1

Line $m \parallel n$, and intersected by transversal l. Identify all pairs of corresponding angles, alternate exterior angles, vertical angles, alternate interior angles, and same-side interior angles in the figure below.



Strategy Use the definitions to find all of the pairs of angles.

Step 1 Find all of the pairs of corresponding angles.

Step 2 Find all of the pairs of alternate exterior angles.

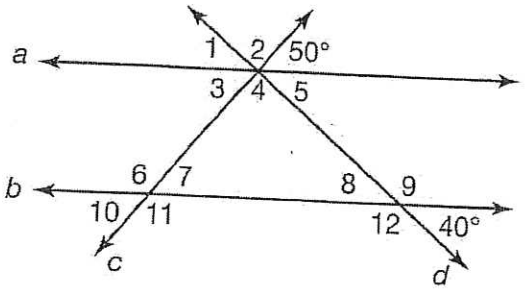
Step 3 Find all of the pairs of vertical angles.

Step 4 Find all of the pairs of alternate interior angles.

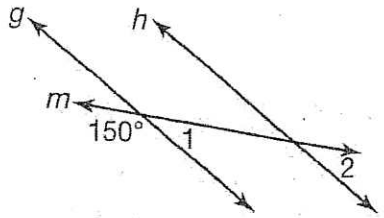
Step 5 Find all of the pairs of same-side interior angles.

Example 2

In the figure below, $a \parallel b$, and both lines are cut by transversals c and d. What are the missing angle measures in the figure?

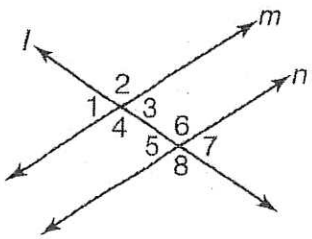


In the figure below, lines g and h are parallel and cut by transversal m. What is the measure of $\angle 2$?



3 LESSON PRACTICE

Use the figure below for questions 1–3. Lines *m* and *n* are parallel and are intersected by transversal *l*. No angle is a right angle.



1. Which angle forms a pair of alternate interior angles with ∠5?

   A. ∠3
   B. ∠4
   C. ∠7
   D. ∠8

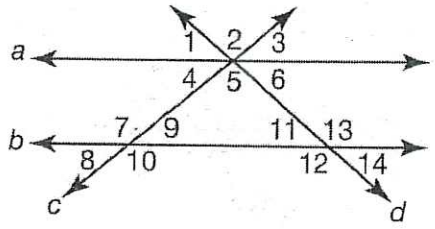
2. Which angles have the same measure?

   A. ∠1 and ∠6
   B. ∠4 and ∠6
   C. ∠5 and ∠8
   D. ∠5 and ∠4

3. Which angles do **not** have the same measure?

   A. ∠5 and ∠7
   B. ∠4 and ∠2
   C. ∠1 and ∠7
   D. ∠4 and ∠3

Use the figure below for questions 4–6. Lines *a* and *b* are parallel and are intersected by transversals *c* and *d*.



4. Which correctly describes the relationship between ∠11 and ∠6?

   A. corresponding angles
   B. vertical angles
   C. alternate interior angles
   D. alternate exterior angles

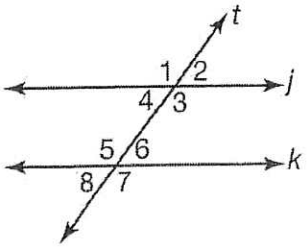
5. Which correctly describes the relationship between ∠7 and ∠9?

   A. corresponding angles
   B. same-side interior angles
   C. supplementary angles
   D. vertical angles

6. Which correctly describes the relationship between ∠1 and ∠14?

   A. alternate interior angles
   B. alternate exterior angles
   C. corresponding angles
   D. same-side interior angles

Use the figure below for questions 7 and 8. Lines *j* and *k* are parallel and are intersected by transversal *t*. No angle is a right angle.



7 Which of the following statements is true?

A. ∠1 and ∠3 are vertical angles and alternate interior angles.

B. ∠4 and ∠6 are alternate interior angles and supplementary angles.

C. ∠4 and ∠6 are alternate interior angles and have the same measure.

D. ∠7 and ∠2 are corresponding angles and have the same measure.

8 Suppose that *t* is moved so that the measure of ∠2 increases. Which of the following is true?

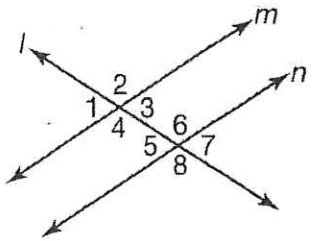
A. The measure of ∠1 will stay the same.

B. The measure of ∠5 will increase.

C. The measure of ∠7 will increase.

D. The measure of ∠4 will increase.

9 Lines *m* and *n* are parallel and are intersected by transversal *l*. Suppose that line *l* is moved so that ∠2 becomes a right angle.



Which of the following is a reasonable argument?

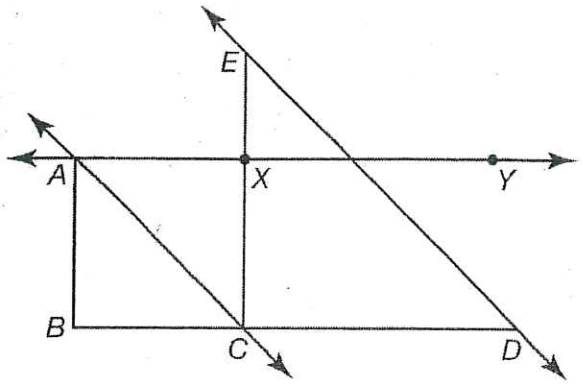
A. If ∠2 is a right angle, then ∠4 is also a right angle (vertical angles). Since ∠4 and ∠6 are alternate interior angles and lines *m* and *n* are parallel, then ∠6 is a right angle. Thus, *n* and *l* are perpendicular lines.

B. If ∠2 is a right angle, then ∠4 is also a right angle (vertical angles). Since ∠4 and ∠6 are alternate exterior angles and lines *m* and *n* are parallel, ∠6 is a right angle. This implies that lines *n* and *l* are perpendicular.

C. If ∠2 is a right angle, then ∠4 is also a right angle (vertical angles). Since ∠4 and ∠6 are alternate interior angles and lines *m* and *n* are parallel, ∠6 is a right angle. This implies that lines *n* and *l* are not perpendicular.

D. If ∠2 is a right angle, then ∠4 is also a right angle (vertical angles). Since ∠4 and ∠3 are supplementary angles, ∠3 is also a right angle. This implies that lines *n* and *l* are perpendicular.

10 In the figure below, $\overleftrightarrow{AC} \parallel \overleftrightarrow{ED}$, $\overline{AB} \parallel \overline{XC}$, and $\angle ABC$ is a right angle.



Which of the following is **not** correct?

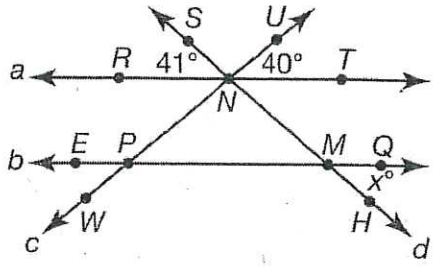
A. Since $\overleftrightarrow{AC} \parallel \overleftrightarrow{ED}$, $\angle CED$ and $\angle ACE$ have the same measure because they are alternate interior angles formed by $\overline{EC}$ intersecting $\overleftrightarrow{AC}$ and $\overleftrightarrow{ED}$.

B. Since $\overleftrightarrow{AC} \parallel \overleftrightarrow{ED}$, $\angle CED$ and $\angle ACE$ have the same measure because they are corresponding angles formed by $\overline{EC}$ intersecting $\overleftrightarrow{AC}$ and $\overleftrightarrow{ED}$.

C. Since $\overline{AB} \parallel \overline{XC}$, $\angle ABC$ and $\angle XCD$ have the same measure because they are corresponding angles formed by $\overline{BC}$ intersecting $\overline{AB}$ and $\overline{XC}$. So, $\angle XCD$ is also a right angle.

D. Since $\overline{AB} \parallel \overline{XC}$, $\angle XCA$ and $\angle BAC$ have the same measure because they are alternate interior angles formed by $\overline{AC}$ intersecting $\overline{AB}$ and $\overline{XC}$.

Use the figure below for questions 11–13. Lines *a* and *b* are parallel.



11 Which of the following is true?

A. $m\angle EPW = 40.5°$

B. $m\angle EPW = 41°$

C. $m\angle EPW = 40°$

D. $m\angle EPW = 138°$

12 What is the value of x?

A. 40

B. 41

C. 99

D. 139

13 Which of the following is **not** true?

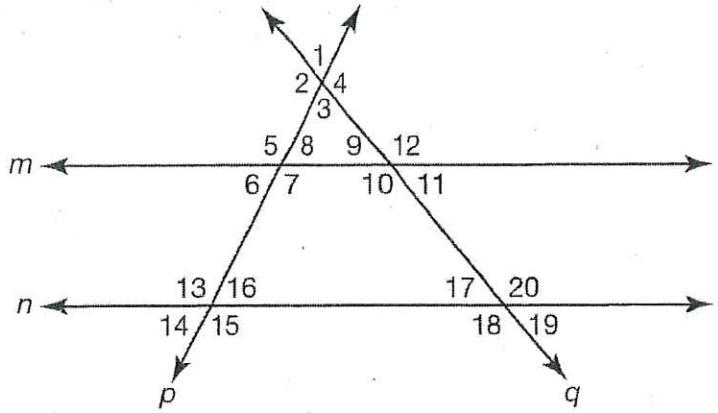
A. $m\angle RNP = 40°$

B. $m\angle RNM = 139°$

C. $m\angle PNM = 99°$

D. $m\angle PNT = 139°$

14 In the figure below line m ∥ line n.



Part A

Which angles in the figure are **not** formed by a transversal intersecting a pair of parallel lines?

Part B

$m\angle 1$ is 65° and $m\angle 5$ is 117°. What are the measures of the remaining angles in the figure? For each angle measure, name the relationship you used to find it.

$m\angle 1 =$	$m\angle 11 =$
$m\angle 2 =$	$m\angle 12 =$
$m\angle 3 =$	$m\angle 13 =$
$m\angle 4 =$	$m\angle 14 =$
$m\angle 5 =$	$m\angle 15 =$
$m\angle 6 =$	$m\angle 16 =$
$m\angle 7 =$	$m\angle 17 =$
$m\angle 8 =$	$m\angle 18 =$
$m\angle 9 =$	$m\angle 19 =$
$m\angle 10 =$	$m\angle 20 =$

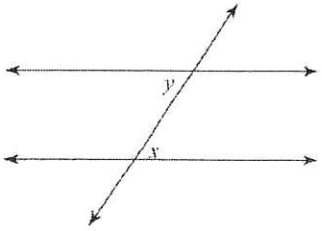
Geometry Name_____ ID: 1

Assignment

Date_____ Period____

Identify each pair of angles as corresponding, alternate interior, alternate exterior, same-side interior, vertical, or adjacent.

1)



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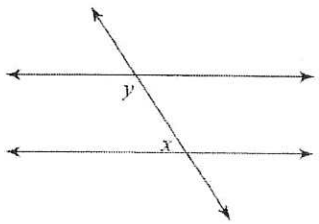

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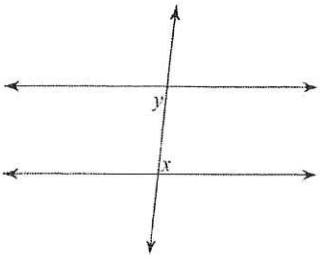

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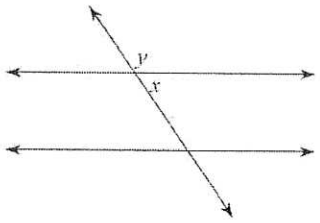

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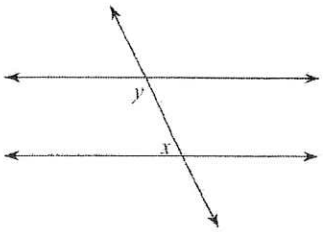

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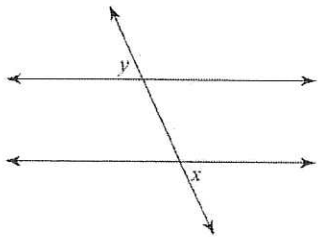

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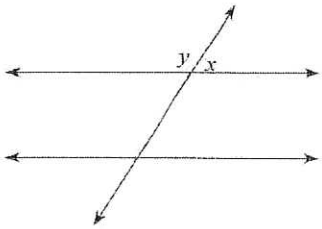

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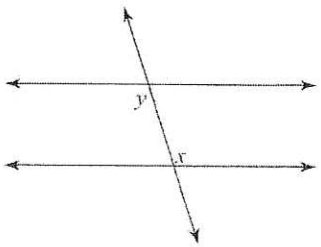

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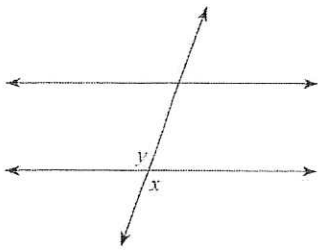

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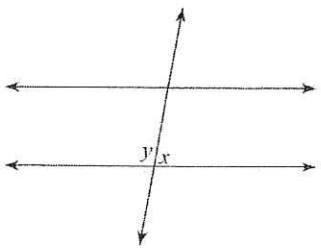
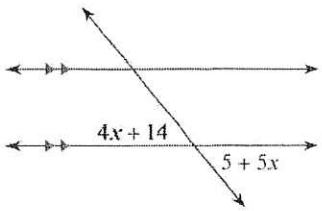


Find the measure of the angle indicated in bold.

11)



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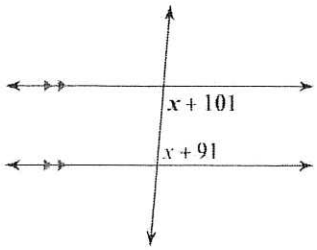

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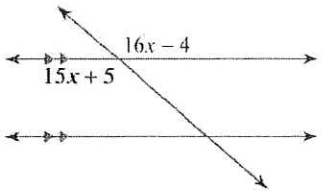

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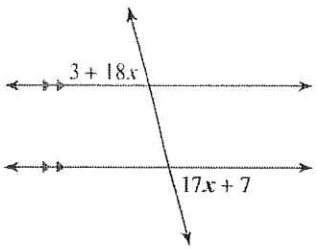

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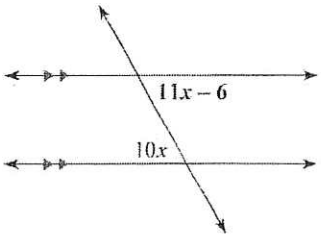

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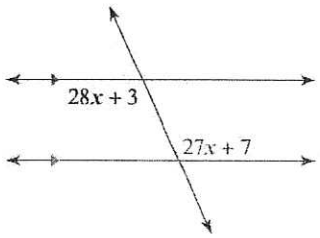

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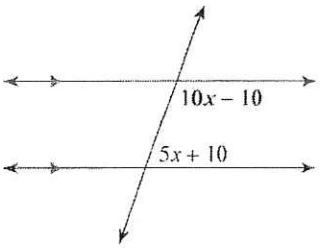

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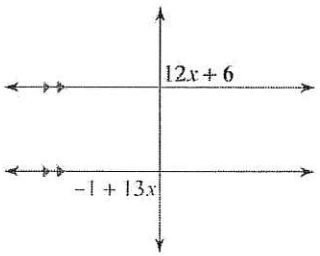

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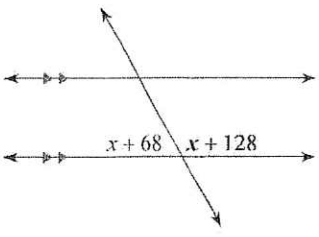

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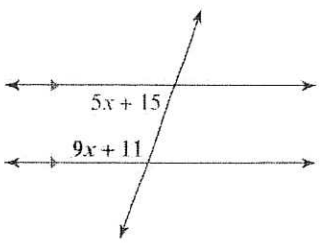


40

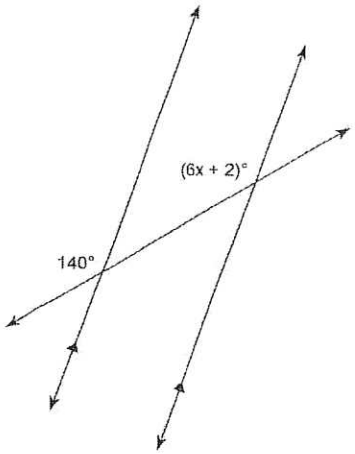
Angle Review

Name_____

Date_____ Period____

Find the value of x. Find the measure of theangles involved.

1)



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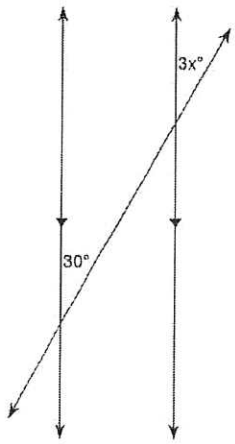
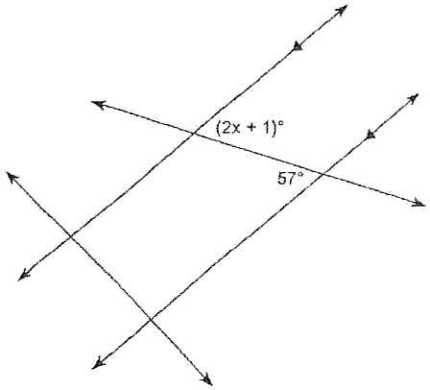


3)



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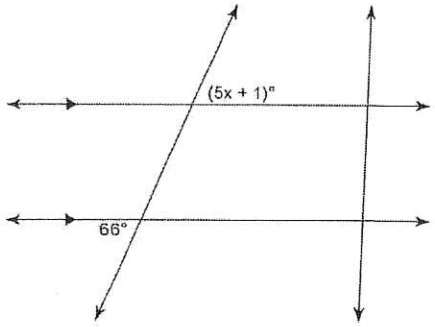

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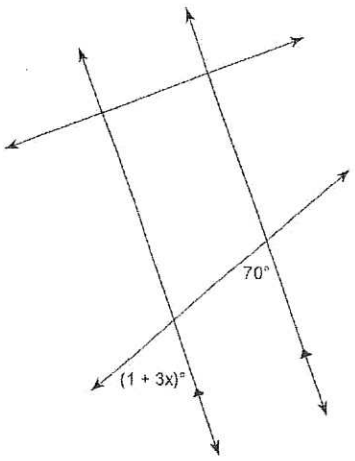

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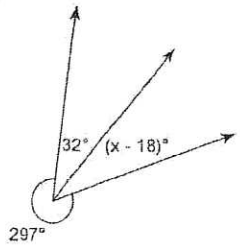

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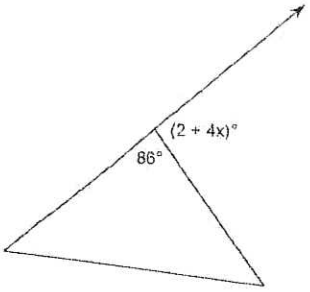

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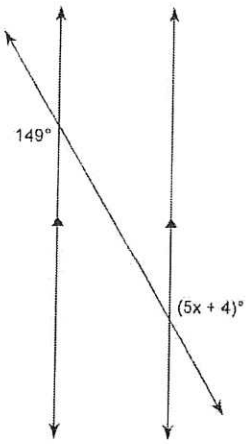

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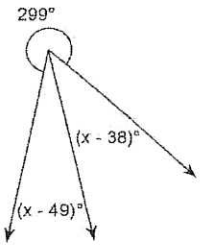

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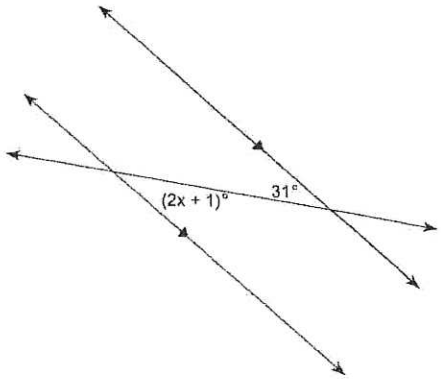

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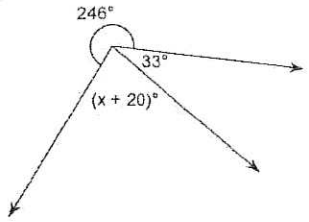

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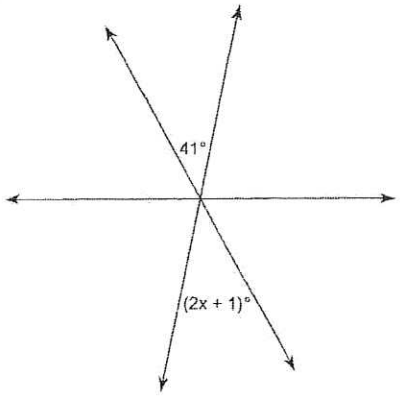


Geometry

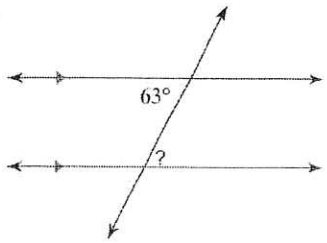
Name_____ ID: 1

Assignment

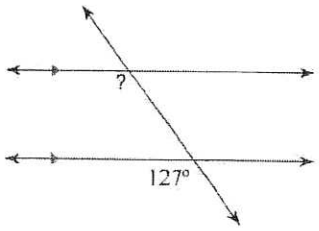
Date_____ Period____

Find the measure of each angle indicated.

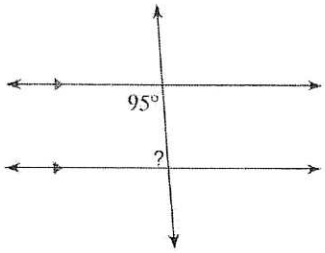
1)



2)



3)



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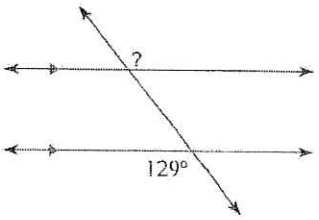

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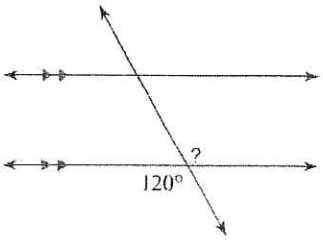

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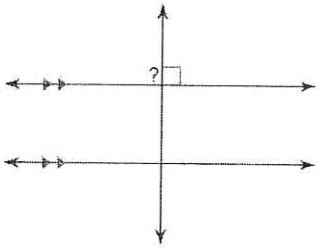

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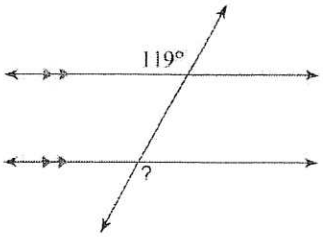

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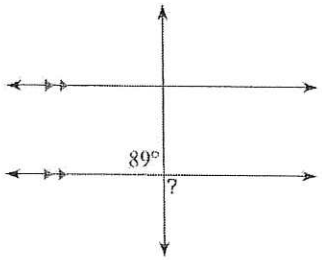

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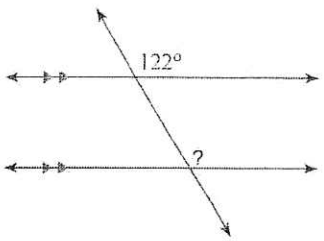

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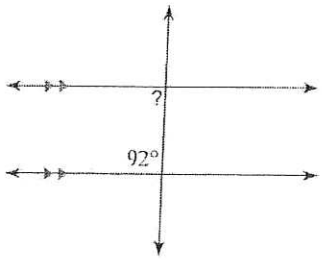
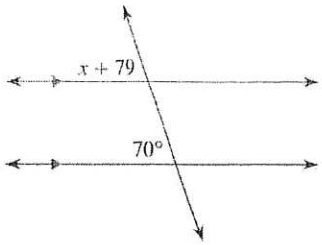


Solve for x.

11)



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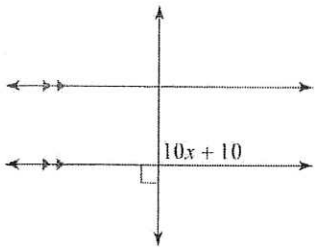

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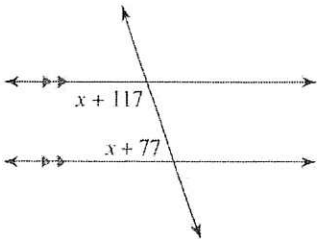

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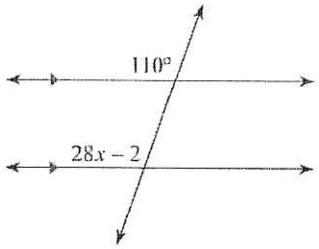

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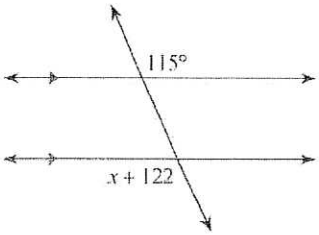

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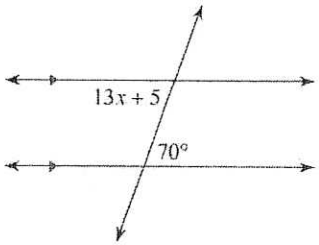

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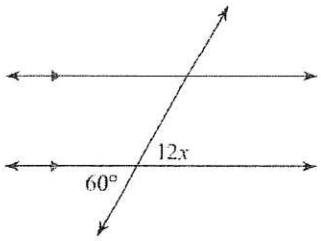

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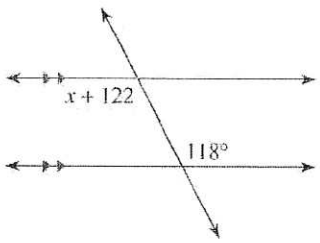

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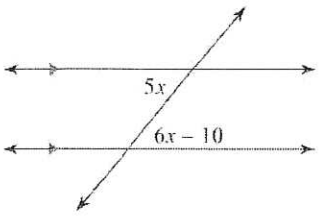

20)