Name: ______________________________

Geometry

Unit 1: Essentials of Geometry

<u>Priority Standard:</u> G.CO.1: Know precise definition of angles, circle, perpendicular line, parallel line and line segment, based on the undefined notions of point, line distance along a line and distance around a circular arc.

Unit "I can" statements:

1. I can name and sketch geometric figures.
2. I can use segment postulates to identify congruent segments.
3. I can use the midpoint and distance formulas.
4. I can name, measure and classify angles.
5. I can use special angle relationships to find angle measures.
6. I can classify polygons.
7. I can the perimeter/circumference and area of squares, rectangles, triangles and circles.

Common Core State Standards that are addressed in this unit include:
For more information see www.corestandards.org/Math/

Chapter 1.1: Identify Points, Lines and Planes

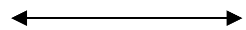
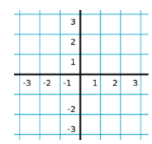
Objective: I can name and sketch geometric figures.

Algebra Review:

1. Simplify if $x = 2$; $-18 + 3x$

2. Solve for x; $8x + 12 = 60$

3. Simplify; $|3 - 11|$

Term	Definition	Example/Symbols	
Point	Has ________ dimension Represented with a ______________	 	
Line	Has ________ dimension Represented by a line with two __________________________, but extends ____. **NOTE:**		
Plane	Has ________ dimension and extends ___________________________. **NOTE:**		
Collinear Points			
Coplanar Points			
Line Segment, Endpoints	Part of the line that consists of two ______________ (called _________________) and all the points on the line between them.		

Ray	Ray AB consists of the _________________ A and all endpoints on ________ that lie on the same side as B.		
Opposite Rays			
Intersection	When two or more geometric figures cross at a similar point or line.		

Example #1: Use the diagram to answer the following questions (Line *b* and point P lie on Plane Z).

a.) Give two other names for $\overleftrightarrow{LN}$.

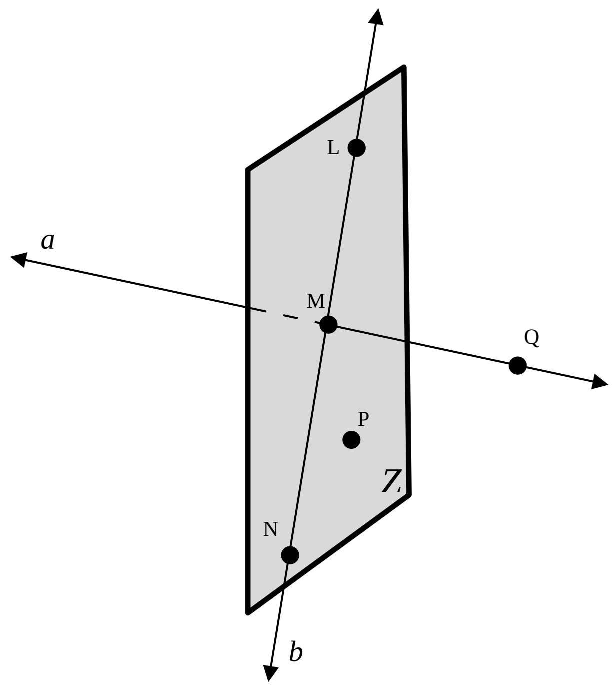
b.) Give two other names for plane Z.

c.) Name three points that are collinear.

d.) Name four points that are coplanar.

e.) Give two other names for $\overleftrightarrow{MQ}$.

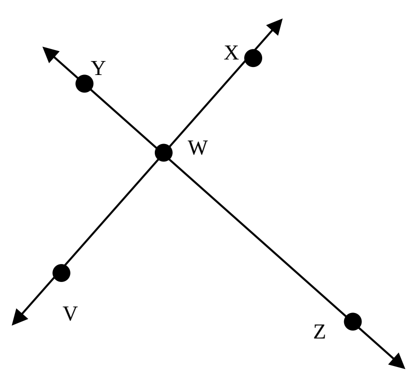
f.) Name a point that is not coplanar with points L, N and P.



Example #2: Use the diagram to answer the following questions

a.) Give another name for $\overline{VX}$

b.) Name all rays with endpoints W. Which are opposite rays?



c.) Give another name for $\overline{YW}$

d.) Are $\overrightarrow{VX}$ and $\overrightarrow{XV}$ the same ray? Are $\overrightarrow{VW}$ and $\overrightarrow{VX}$ the same ray?

Example #3: Sketch the following descriptions

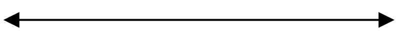
a.) A plane and a line that intersects the plane at more than one point.

b.) A plane and a line that is in the plane AND another line that intersects the line and plane at a point.

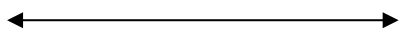
c.) Two planes that intersect in a line.

Example #4: Graph the inequality on a number line. Tell whether the graph is a segment, a ray or rays, a point, or a line.

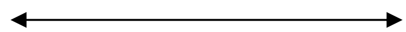
a.) $x \geq 2$



b.) $2 \leq x \leq 5$



c.) $x \leq 0$ or $x \geq -8$



Chapter 1.2: Use Segments and Congruence

Objective: I can use segment postulates to identify congruent segments.

Postulate or Axiom:

Theorem:

Postulate 1: Ruler Postulate

The points on a line can be matched one to one with real numbers. The real number that correspond to a point is the ______________________________ of the point.

The _________________________ between points A and B (Written as ________), is the absolute value of the difference of the coordinates of A and B.

Between:

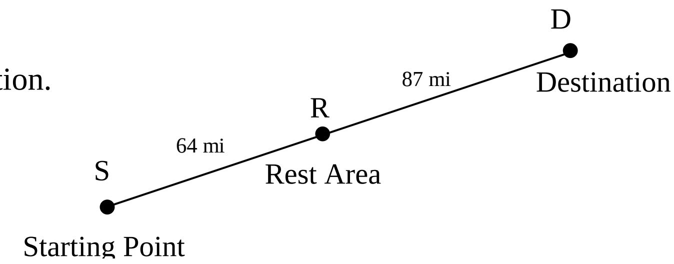
Postulate 2: Segment Addition Postulate

If B is between A and C, then _____________________________

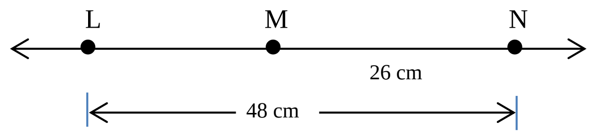
If $AB + BC = AC$, then ___________________________________

________________________ .

Example #1: The locations shown lie in a straight line.
Find the distance from the starting point to the destination.



Example #2: Use the diagram to find LM

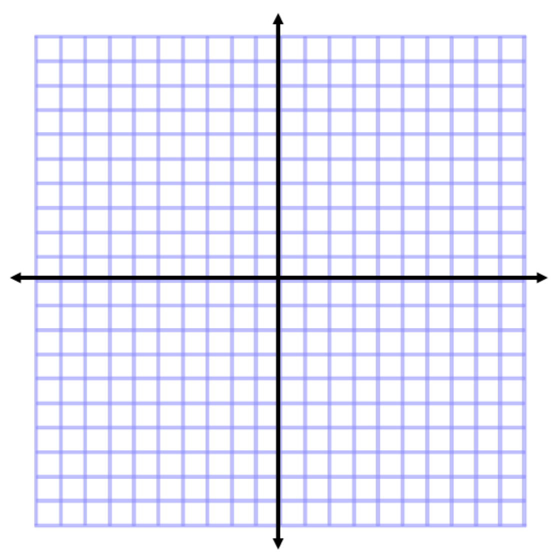


Congruent Line Segments:

Symbols:

What is the difference between = and ≅ ?

Example #3: Plot F(4,5), G(-1, 5), H(3, 3), and J(3, -2) in a coordinate plane.
Then determine whether $\overline{FG}$ and $\overline{HJ}$ are congruent.



Chapter 1.3: Use Midpoint and Distance Formula

Objective: I can use the midpoint and distance formulas

Algebra Review:

1. You are given an equation of a line and a point. Use substitution to determine whether the point is on the line.

a.) $y = -x + 3;\ A(6,3)$

b.) $y = -x + 3$; A(6, 3)

2. Simplify. Round to the nearest hundredth when necessary.

a.) $\sqrt{9}$

b.) $\sqrt{-9}$

c.) $\sqrt{20}$

d.) $\sqrt{100}$

e.) $\sqrt{12}$

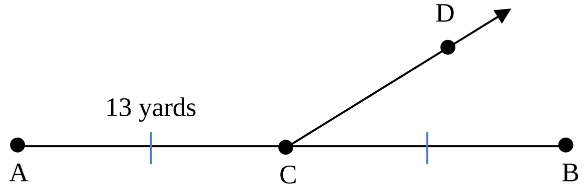
Midpoint:

The point that _______________ a line segment into two _______________ segments.

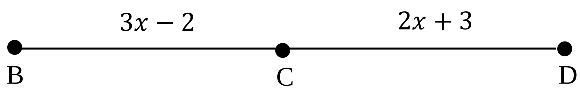
Segment Bisector:

A point, ray, line, line segment or plane that _______________ a line segment at its _______________

Example #1: Find AB.



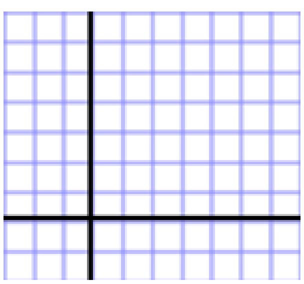
Example #2: Point C is the midpoint of $\overline{BD}$. Find the length of $\overline{BC}$.



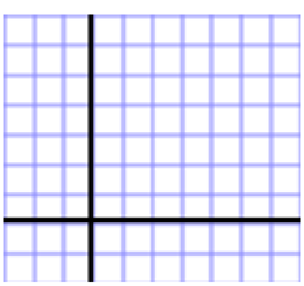
Midpoint Formula:

If A(x_1, y_1) and B (x_2, y_2) are points in a coordinate plane, then midpoint M of $\overline{AB}$ has coordinates

Example #3: The endpoints of $\overline{PR}$ are P(-2, 5) and R(4, 3). Find the coordinates of the midpoint M.



Example #4: The midpoint of $\overline{AC}$ is M(3, 4). One endpoint is A(1, 6). Find the coordinates of endpoint C.



Distance Formula:

If A(x_1, y_1) and B (x_2, y_2) are points in a coordinate plane, then the distance between A and B is

Example #5: What is the approximate length of $\overline{RT}$, with endpoints R(3, 2) and T (-4, 3)?

Example #6: What is the approximate length of $\overline{GH}$, with endpoints G(5, -1) and H(-3, 6)?

Chapter 1.4: Measure and Classify Angles

Objective: I can name, measure and classify angles.

Review:

1. Find the coordinates of the midpoint and length of $\overline{LR}$, with endpoints L(3, -7) and R(-1, 9).

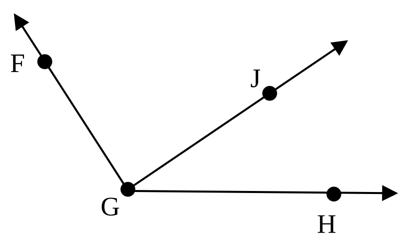
An ________________ consists of two different rays with the same _____________________.

The rays are the ___________ of the angle.

The endpoint is the ___________ of the angle.

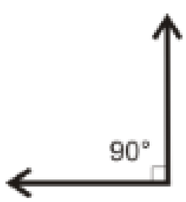
Name:

But how should you name this next example?



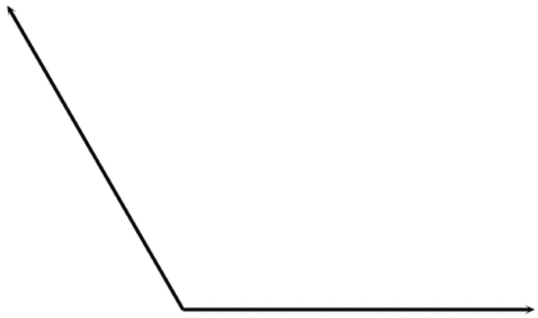
Measuring Angles:

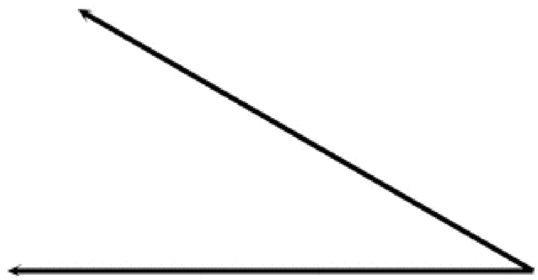
A _______________________ can be used to approximate the _______________________ of an angle. An angle is measured in units called ______________________.



Using Words:

Using Symbols:





Classifying Angles:

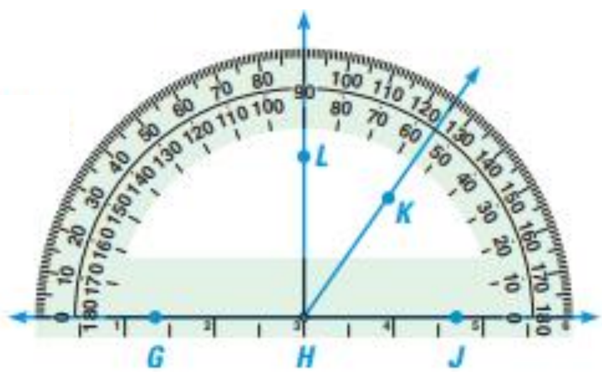
Example #1: Use the diagram of the indicated angle. Then classify the angle.

a.) $m\angle JHL =$

b.) $m\angle GHK =$

c.) $m\angle JHG =$

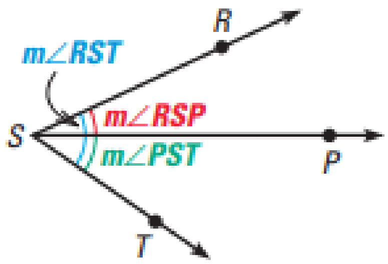
d.) $m\angle JHK =$



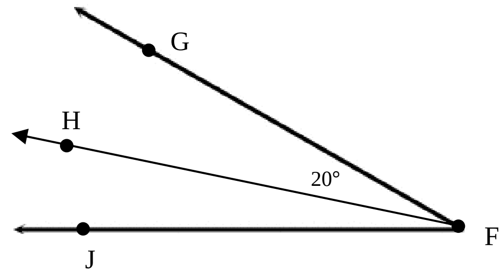
Angle Addition Postulate: **(Postulate 4)**

If P is the interior of $\angle RST$, then the measure of $\angle RST$ is equal to the

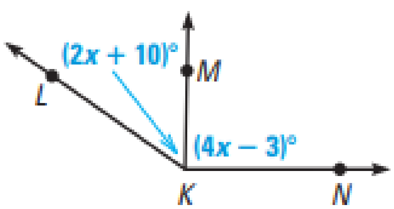
sum of the measures of ____________ and ______________



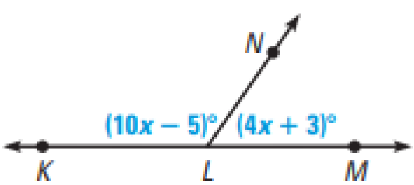
Example #2: Given that $m\angle GFJ = 35°$, find $m\angle HFJ$.



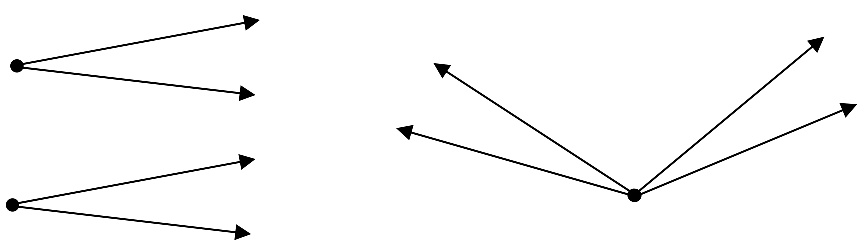
Example #3: Given that $m\angle LKN = 145°$, find $m\angle LKM$ and $m\angle MKN$.



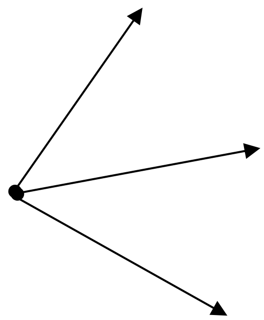
Example #4: Given that $\angle KLM$ is a straight angle, find $m\angle KLN$ and $m\angle NLM$



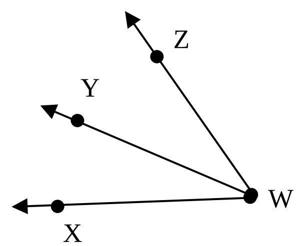
Two angles are **congruent angles** if they have the same ____________________.



Angle Bisector: A ray that divides an angle into two angles that are ________________________

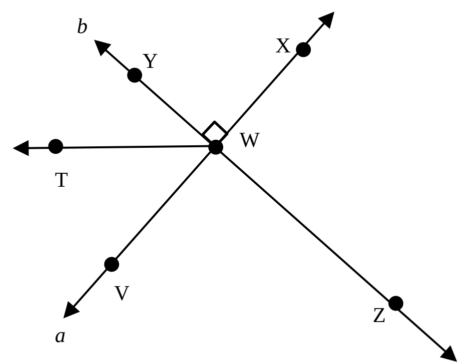


Example #5: In the diagram, $\overrightarrow{WY}$ bisects $m\angle XWZ$ and $m\angle XWY = 29°$. Find $m\angle XWZ$.



Chapter 1.5: Describe Angle Pair Relationships

<u>Objective:</u> I can use special angle relationships to find angle measures.



Review:

1. How many points determine a line?

2. How many points determine a plane?

3. Use the diagram to help you answer the following questions.

a.) Give two more names for $\overleftrightarrow{YW}$

b.) Name two line segments

c.) Name all the rays with endpoint W

d.) Name a pair of opposite rays

e.) Name an acute angle

f.) Name an obtuse angle

g.) Name a right angle

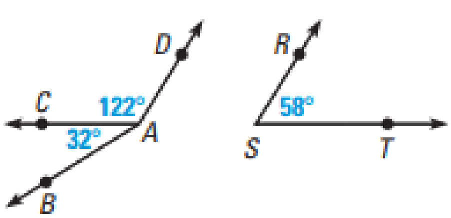
h.) Name a straight angle

Important: Angle Pair Relationships

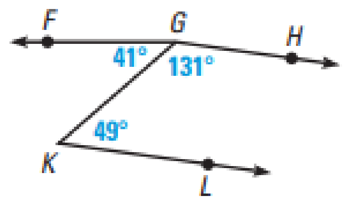
Name	Definition	Example
Complementary Angles	Two angles whose sum is _______	
Supplementary Angles	Two angles whose sum is _______	
Adjacent Angles	Two angles that share a common _________ and _________ , but have no common _____________ point	
Linear Pair	Two _____________ angles are a linear pair if the non-common sides are _____________ rays.	
Vertical Angles	Two angles are vertical if their sides form __________ pairs of opposite rays.	

Example #1: In the figure, name a pair of complementary angles, a pair of supplementary angles and a pair of adjacent angles.

a.)



b.)

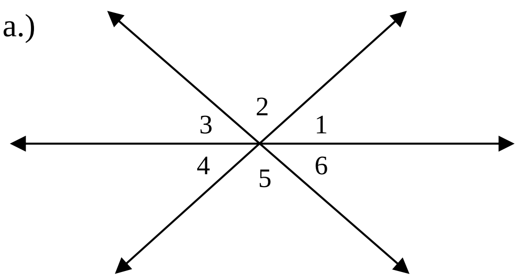


Example #2 Given that $\angle 1$ is a **supplement** of $\angle 2$ and $m\angle 1 = 54°$, find $m\angle 2$.

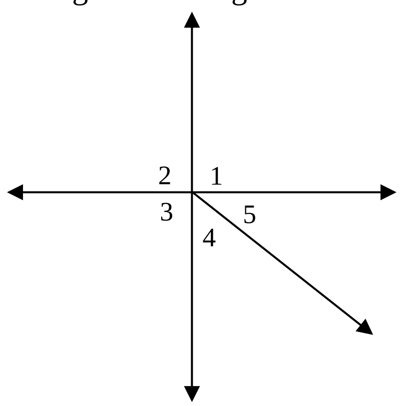
Example #3: Given that $\angle 3$ is a **complement** of $\angle 4$ and $m\angle 4 = 18°$, find $m\angle 3$.

Example #4: Identify all of the linear pairs and all of the vertical angles in the figure.

a.)



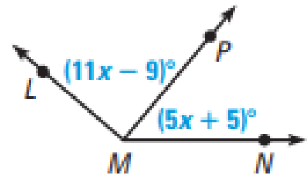
b.)



Example #5: Two angles form a linear pair. The measure of one angle is 4 times the measure of the other. Find the measure of each angle.

Concept Check:

1. In the diagram shown, $m\angle LMN = 140°$. Find $m\angle PMN$



2. $\overrightarrow{VZ}$ bisects $\angle UVW$, and $m\angle UVZ = 81°$. Find the $m\angle UVW$. Then classify $\angle UVW$ by its angle measure.

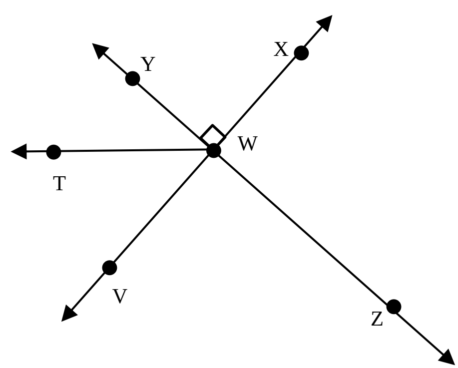
3. $\angle 1$ and $\angle 2$ are complementary angles. Find the measures of the angles when $m\angle 1 = (x - 10)°$ and $m\angle 2 = (2x + 40)°$

Chapter 1.6: Classifying Polygons

Objective: I can classify polygons.

Review:

1. Use the diagram to help you answer the following questions



a.) Name a pair of complementary angles

b.) Name a pair of supplementary angles

c.) Name two pair of adjacent angles.

d.) Name a linear pair

e.) Name all sets of vertical angles

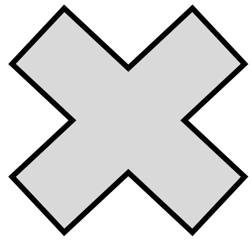
Identifying Polygons:

A **polygon** is ____

1. It is formed by ________________________________ line segments called ______________.
2. Each side _________________ exactly two sides, one at each ____________________, so that no two sides with a common endpoint are collinear.

A **vertex** is ____

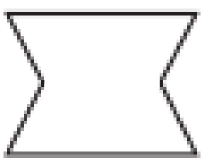
A polygon is _____________________ if no line that contains a side of the polygon contains a point in the interior of the polygon.



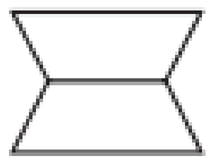
A polygon that is not_____________________ is called _____________________.

Example #1: Tell whether the figure is a polygon and whether it is convex or concave.

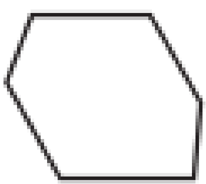
a.)



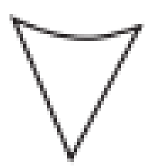
b.)



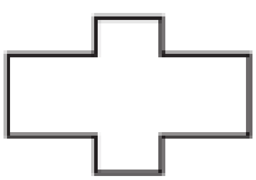
c.)



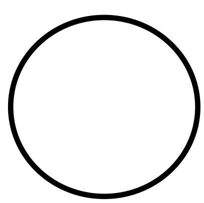
d.)



e.)



f.)



The term n-gon, where n is the number of a polygon's sides, can also be used to name a polygon.
Example: A polygon with 18 sides is a 18-gon.

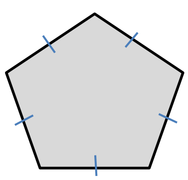
Number of Sides	Type of Polygon
3	
4	
5	
6	
7	
8	
9	
10	
12	
n	

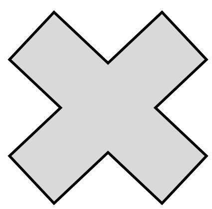
In an **Equilateral Polygon**, ______________________________________.

In an **Equiangular Polygon**, ______________________________________.

A **Regular Polygon**, ____.

Example #2: Classify the polygon by the number of sides. Tell whether the polygon is equilateral, equiangular or regular. Explain your reasoning.

a.) 

b.) 

Example #3: The lengths (in feet) of two sides of a regular quadrilateral are represented by the expressions $8x - 6$ and $4x + 22$. Find the perimeter of the quadrilateral.

Example #4: The expressions $(3x + 63)°$ and $(7x - 45)°$ represent the measures of two angles of a regular decagon. Find the measure of the decagon.