1.1 Points, Lines, and Planes

Targets

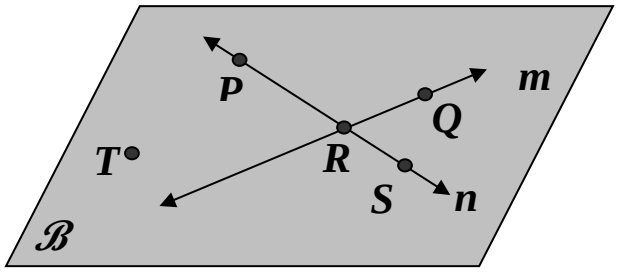
- I can identify and draw points, lines, and planes.
- I can identify and draw collinear and coplanar points.
- I can identify and draw intersecting lines and planes in space.

Vocabulary

Term	Definition	Named by/Properties	Picture
Point			
Line			
Plane			
Collinear			
Coplanar			

Instruction

Example 1:



a. Name a line that contains point *Q*. _____

b. Name the plane that contains lines *n* and *m*. _____

c. Name the intersection of lines *n* and *m*. _____

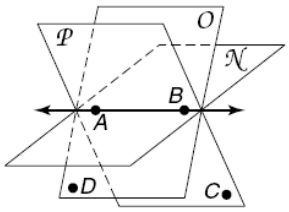
d. Name a point not contained on lines *n* or *m*. _____

e. What is another name for line *n*? _____

f. Name 3 collinear points. _____

Instruction

Example 2:
Where do planes $\mathscr{P}$ and planes $\mathscr{N}$ intersect?



Instruction

Your Turn:

Draw and label a plane $\mathscr{R}$ that meets **all** the following conditions.

- Plane $\mathscr{R}$ contains $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ which intersect at point *E*.
- Point *G* is located on plane $\mathscr{R}$ but is not collinear with $\overleftrightarrow{AB}$ or $\overleftrightarrow{CD}$.
- Plane $\mathscr{Q}$ intersects plane $\mathscr{R}$ at $\overleftrightarrow{LM}$.

1.2 Measuring Segments

Targets

- I can measure segments.
- I can find the measure of missing parts of segments with numbers given.
- I can find the measure of missing parts of segments using algebra.

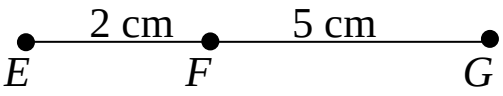
Vocabulary

Term	Definition	Named by/Properties	Picture
Line Segment			
Segment Addition Postulate (SAP)			
Between and/or Betweenness			

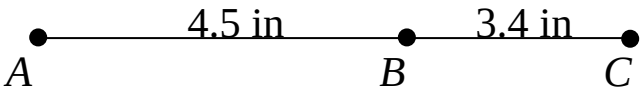
Instruction

Example 1: Find the measurement of each specified line segment. (Assume that each figure is not drawn to scale).

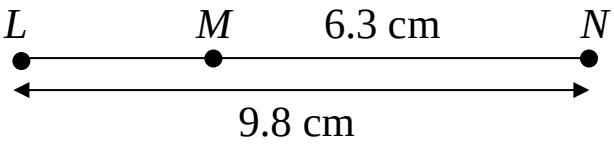
a. $\overline{EG}$



b. $\overline{AC}$

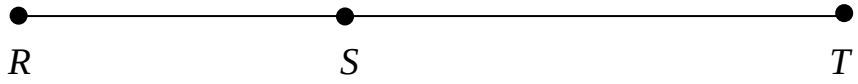


c. $\overline{LM}$



Instruction

Example 2: Find the value of x and ST if $RS = 5x$, $ST = 7x$, and $RT = 48$.



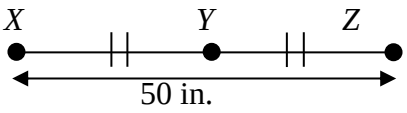
Example 3: Find the value of a and AB if B is **between** A and C and $AB = 4a + 10$, $BC = 3a - 5$, and $AC = 19$.

Example 4: Find the value of x and ST if S is **between** R and T and $RS = 16$, $ST = 2x$ and $RT = 5x + 10$.

Vocabulary	Term	Definition	Named by/Properties	Picture
	Congruent Segments			

Instruction

Example 5: Find *YZ*.



Example 6: Find the value of *n* if *B* is between *A* and *C*, $\overline{AB} \cong \overline{BC}$, and $AB = 2n - 10$, and $AC = 18$.

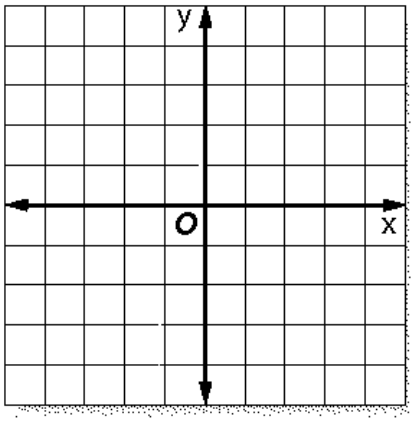
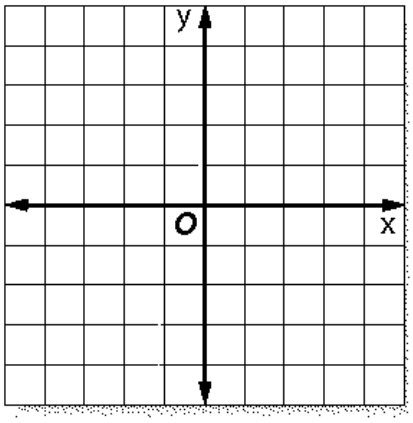
Your Turn: Find *y* and *PQ* is *P* is between *Q* and *R*, $PQ = 2y$, $QR = 3y + 1$, and $PR = 21$.

y = _____ *PQ* = _____

1.3 Distance and Midpoints

Targets	
	○ I can find the distance between 2 points. ○ I can find the midpoint of a segment.

Method 1: Pythagorean Theorem

Instruction		
	Example 1: Find the distance between (1, 2) and (3, 5) geometrically. 	*Your turn:* Find the distance between (-2, -3) and (3, 1) geometrically. 

Method 2: Distance Formula

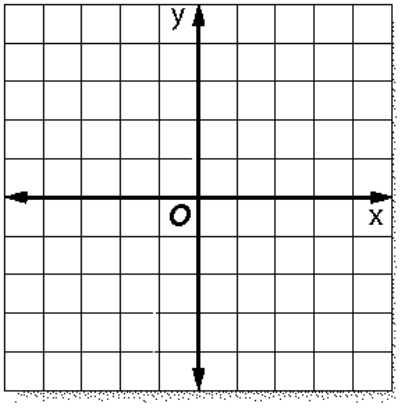
The distance between 2 points (x_1, y_1) and (x_2, y_2) can be computed as follows:

Instruction		
	Example 2: Find the distance between (1, 2) and (3, 5) using the Distance Formula.	*Example 3:* Find the distance between (4, 7) and (-3, -6) using the Distance Formula.

Your Turn:
Find the distance between (7, -8) and (-4, -2) using the Distance Formula.

Instruction

Example 5:
The coordinates of the vertices of triangle *ABC* are located at *A*(4, 3), *B*(1, -2), and *C*(-5, 1). Find the perimeter of the triangle.



Vocabulary

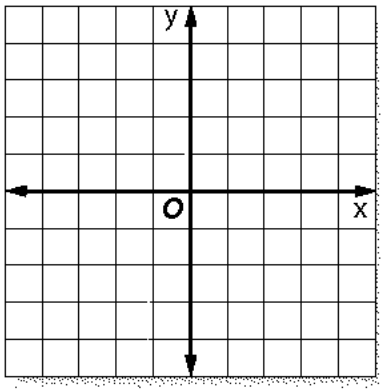
Term	Definition	Named by/Properties	Picture
Midpoint			
Segment Bisector			

Midpoint Formula

If a segment has endpoints with coordinates (x_1, y_1) and (x_2, y_2),
then the coordinates of the midpoint of the segment are

Instruction

Example 6:
Find the coordinates of the midpoint of a segment having the given endpoints.
$T(5, -4)$ and $H(-1, 2)$



Instruction

Your Turn:
Find the coordinates of the midpoint of a segment having the given endpoints. $V(2, 9)$ and $K(5, -3)$

Your Turn:
Find the coordinates of the midpoint of a segment having the given endpoints. $W(-7, 10)$ and $X(6, -8)$

1.4 Angle Measure

Targets	○ I can measure angles. ○ I can classify types of angles. ○ I can identify and use congruent angles. ○ I can identify and use the bisector of an angle.

Vocabulary	**Term**	**Definition**	**Named by/Properties**	**Picture**
	Ray			
	Angle			
	Congruent Angles			
	Angle Bisector			
	Angle Addition Postulate (AAP)			

Instruction

Example 1:
Refer to the figure at the right.

a. Name the vertex of $\angle 2$.

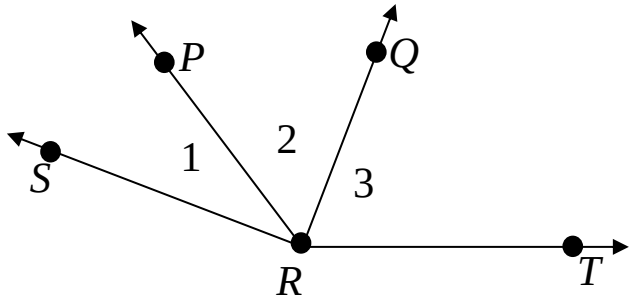
b. Name the sides of $\angle 1$.

c. Name the sides of $\angle 3$.

d. Write 2 other names for $\angle 1$.

e. Write 2 other names for $\angle 2$.

f. How many total angles are shown in the figure?



Vocabulary

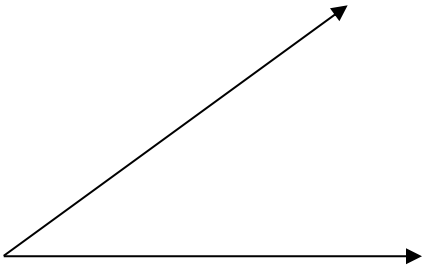
Classifying Angles

Name of Angle	Degree Measure	Picture
Zero Angle		
Acute Angle		
Right Angle		
Obtuse Angle		
Straight Angle		

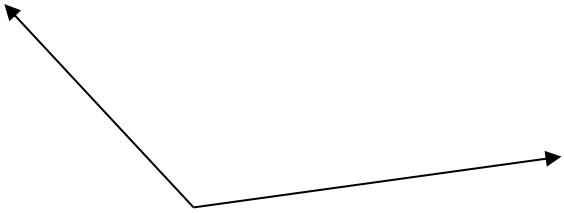
Instruction

Example 2:
Measure each of the following angles to the nearest degree.
Then classify the angle as right, acute, or obtuse.

1.

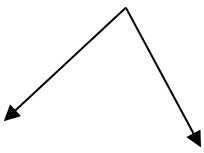


2.



3.

4.

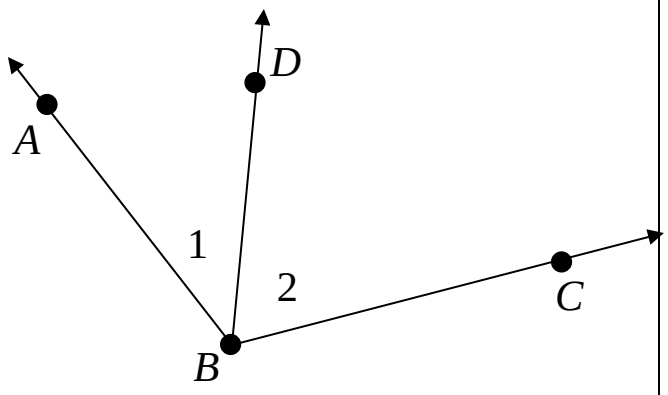


Instruction

Example 3:

Refer to the figure at the right.

If $m\angle 1 = 6x - 2$, $m\angle 2 = 7x + 12$, and $m\angle ABC = 140^{o}$, find $m\angle 2$.

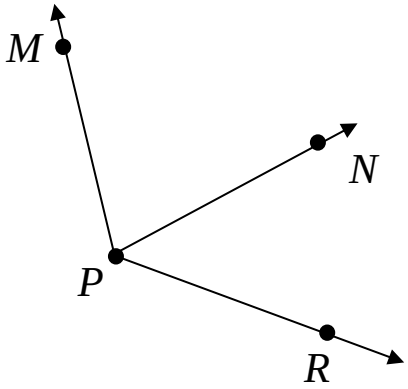


Instruction

Example 4:

Refer to the figure at the right.

If $\overrightarrow{PN}$ bisects $\angle MPR$, $m\angle MPN = 2x + 14$, $m\angle NPR = x + 29$, find the value of x and $m\angle MPR$.

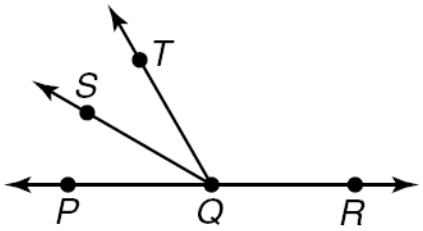


Example 5:

$\overrightarrow{QP}$ and $\overrightarrow{QR}$ are opposite rays.

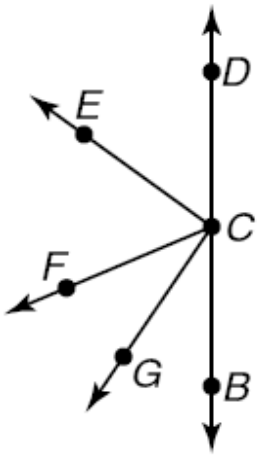
$\overrightarrow{QS}$ bisects $\angle PQT$.

Suppose $m\angle PQT = 60$ and $m\angle PQS = 4x+14$. Find the value of x and $m\angle RQT$.



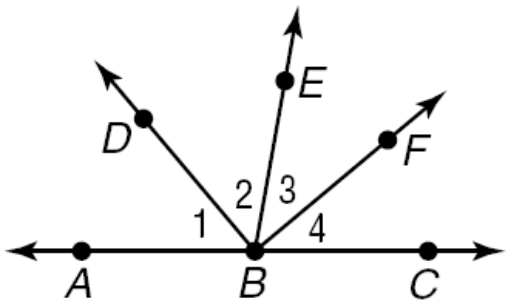
Example 6:

$\overrightarrow{CB}$ and $\overrightarrow{CD}$ are opposite rays. $\overrightarrow{CE}$ bisects $\angle DCF$, and $\overrightarrow{CG}$ bisects $\angle FCB$. Suppose $m\angle DCE = 5x + 10$ and $m\angle GCF = 4x - 1$. Find $m\angle ECF$ and $m\angle GCE$.



Your Turn:

$\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays. $\overrightarrow{BF}$ bisects $\angle CBE$, and $\overrightarrow{BD}$ bisects $\angle ABE$. Suppose $m\angle EBF = 6x + 4$ and $m\angle CBF = 7x - 2$. Find $m\angle EBC$ and $m\angle ABD$.



$m\angle EBC$ = _____

$m\angle ABD$ = _____

1.5 Angle Relationships

Targets	
	o I can identify and use special pairs of angles (complementary, supplementary, adjacent, vertical, linear pair). o I can identify perpendicular lines.

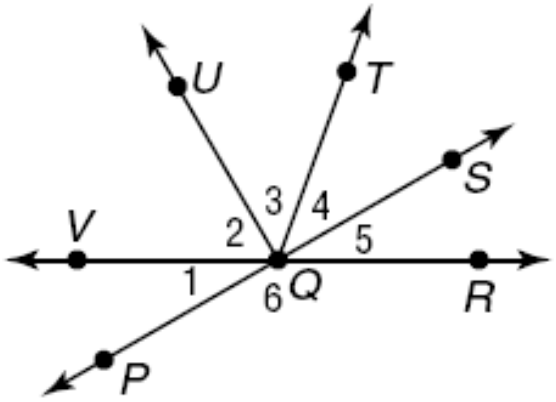
Vocabulary

Angle Relationships

Angle Pair	Description	Picture
Complementary Angles		
Supplementary Angles		
Adjacent Angles		
Linear Pair		
Vertical Angles		
Perpendicular Lines		

Instruction

Example 1:
Refer to the figure at the right.
Identify each pair of angles as *adjacent*, *vertical*, and/or as a *linear pair*.



a. $\angle 1$ and $\angle 2$

b. $\angle 1$ and $\angle 6$

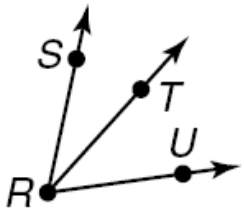
c. $\angle 1$ and $\angle 5$

d. $\angle 2$ and $\angle 3$

Instruction

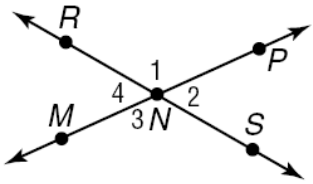
Example 2:
Categorize each pair of angles into all qualifying categories. (complementary, supplementary, adjacent, vertical, linear pair).

a.



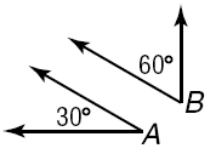
$\angle SRT$ and $\angle TRU$

b.



$\angle RNM$ and $\angle SNM$

c.

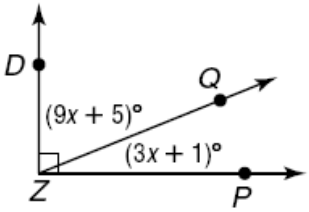


$\angle A$ and $\angle B$

Instruction

Example 3:
Refer to the figure at the right.

Find x so that $\overrightarrow{ZD} \perp \overrightarrow{ZP}$

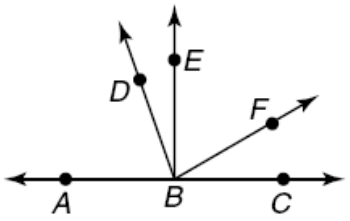


Instruction

Example 4:

Refer to the figure at the right.

If $m\angle EBF = 3x + 10$, $m\angle DBE = x$, $m\angle FBC = 25^{o}$, and $\overrightarrow{BD} \perp \overrightarrow{BF}$. Find the indicated values.



x = _____

$m\angle EBF$ = _____

$m\angle ABD$ = _____

Instruction

Example 5:

Two angles are **complementary**. The measure of one angle is 21 more than twice the measure of the other angle. Find the measure of each angle.

1.6 Polygons

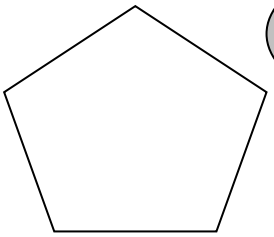
Targets	
	○ I can identify and name polygons. ○ I can find perimeters of polygons.

Vocabulary

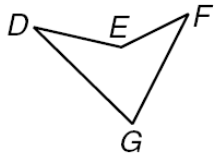
Definition/Characteristics

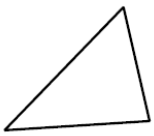
*A polygon is a _____ figure whose sides are all _____.

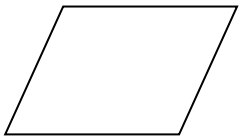
Polygon



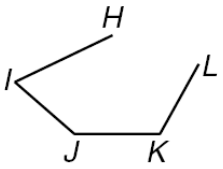
Examples

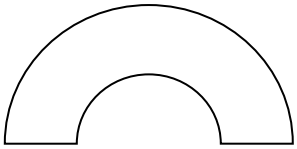






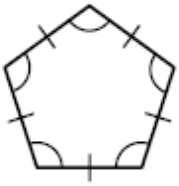
Nonexamples

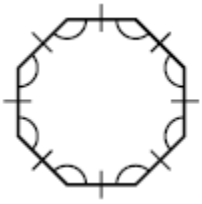




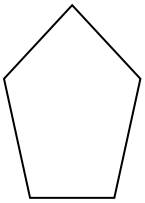
Vocabulary

Regular Polygon:
*a polygon whose _____ are all **congruent** and whose _____ are all **congruent**.





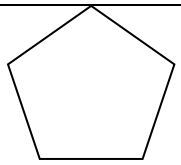
Irregular Polygon:
*a polygon whose *sides* are ***not*** all **congruent** and whose *angles* are ***not*** all **congruent**.



Vocabulary

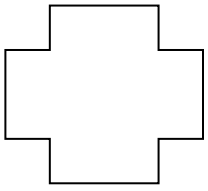
Diagonal:

*a line segment joining two _____ vertices



Concave Polygon:

*a polygon that has at least one diagonal _____ the polygon

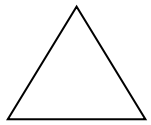
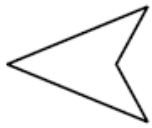
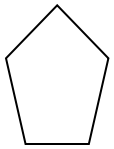
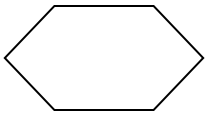
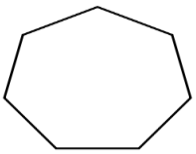
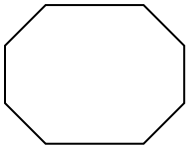
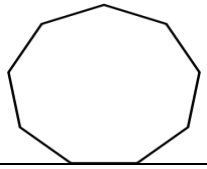
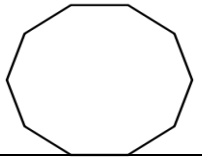
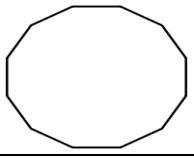


Convex Polygon:

*all the diagonals of the polygon lie **entirely** _____ the polygon.

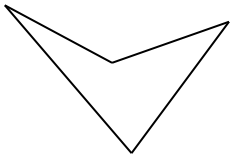
Vocabulary

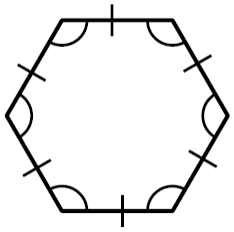
Naming a Polygon by its Number of Sides

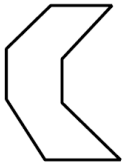
Name	Description	Picture
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
	○ A polygon with _____ sides	
***n*-gon**	○ A polygon with *n* sides	**25-gon: a polygon with _____ sides**

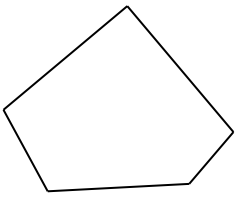
Instruction

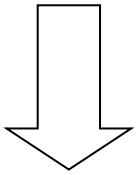
Example 1:
Name each polygon by its number of sides. Then classify it as *concave* or *convex* and *regular* or *irregular*.

1. 

2. 

3. 

4. 

5. 

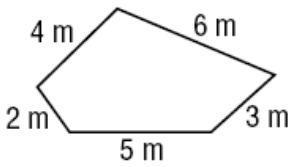
Vocabulary

Perimeter of a Polygon:

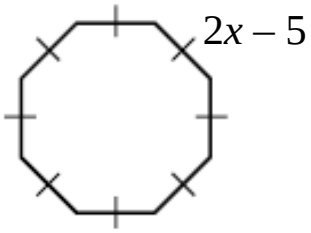
*the _____ of the lengths of all the _____ of the polygon

Instruction

Example 2:
Find the perimeter of each figure.

1. 

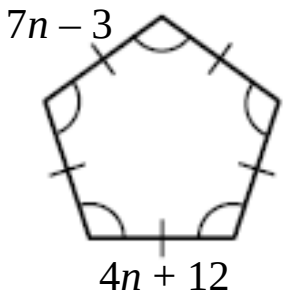
2. $x = 6$



Instruction

Example 3:

a. Find the length of each side of the following polygon.



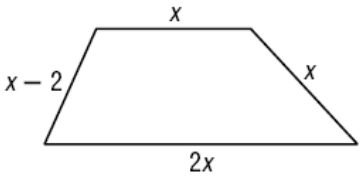
b. Find the length of one side of a regular octagon whose perimeter is the same perimeter as the perimeter of polygon *ABCDE*.

Instruction

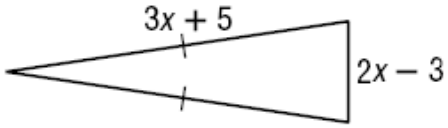
Example 4:

Find the length of each side of the polygon for the given perimeter.

a. Perimeter = 48 inches



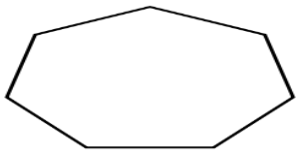
b. Perimeter = 39 centimeters



Instruction

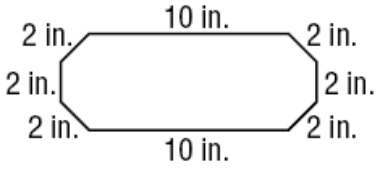
Your Turn:

Name the polygon below its number of sides. Then classify it as *concave* or *convex* and *regular* or *irregular*.



Your Turn:

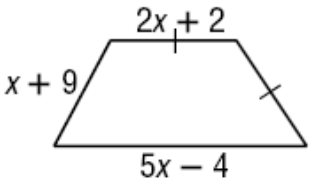
Find the perimeter of the figure below.



Your Turn:

Find the length of each side of the polygon for the given perimeter.

Perimeter = 89 feet



1.7 Basic Constructions

Targets

- I can make basic constructions using a straightedge.
- I can make basic constructions using a compass.

Vocabulary

Tools!

Tool	Description	Picture
Straightedge	A ruler with no markings on it.	
Compass	A geometric tool used to draw _____ and parts of circles called _____.	
Constructions	A geometric figure drawn using a _____ and/or a _____.	

Vocabulary

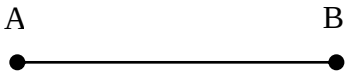
Term	Description	Picture
Perpendicular lines (Review)	Two lines that intersect to form a _____ _____	Symbol: Picture:
Perpendicular Bisector of a Segment	A line, segment, or ray that is perpendicular to the segment at its _____	
Angle Bisector (Review)	A line, segment, or ray that cuts an angle into 2 _____ _____.	

Construction

CONSTRUCTING A PERPENDICULAR BISECTOR

Given: $\overline{AB}$

Construct: $\overleftrightarrow{XY}$ so that $\overleftrightarrow{XY}$ is the perpendicular bisector of $\overline{AB}$



Step 1: Put the compass point on point *A*. Extend the compass MORE THAN half way along the segment and draw a large arc.

Step 2: With the same compass setting, put the compass point on *B*. Draw a large arc. Label the points where the **two large arcs** intersect, *X* and *Y*.

Step 3: Draw $\overleftrightarrow{XY}$ with your straightedge. Label the intersection of $\overleftrightarrow{XY}$ and $\overline{AB}$ with point *M*.

What do we call point *M* ?

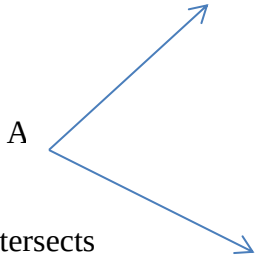
How do we know that the line we just created is the perpendicular bisector of $\overline{AB}$? What tool(s) could we use to verify this?

Construction

CONSTRUCTING ANGLE BISECTORS

Given: $\angle A$

Construct: $\overrightarrow{AD}$, the bisector of $\angle A$.



Step 1: With a compass point on vertex *A*, draw an arc that intersects the sides of $\angle A$. Label the points of intersection *B* and *C*.

Step 2: Put the compass point on *C* and draw an arc (in the large opening of the angle). With the same compass setting, draw an arc using point *B*. Be sure that your arcs intersect. Label the point where the two arcs intersect as *D*.

Step 3: Draw $\overrightarrow{AD}$.

How do we know that $\overrightarrow{AD}$ is the bisector of $\angle A$? What tool could you use to verify this?