Geometry: 1.4-1.6 Notes

NAME_____

1.4 Classify polygons. Find perimeter and area of polygons_____Date:_____

Define Vocabulary:

*polygon

*side

*vertex

**n*-gon

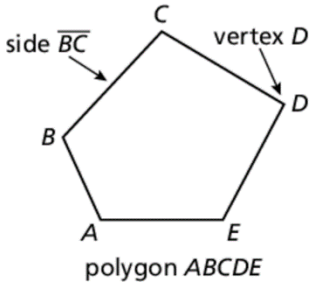
*convex

*concave

Core Concepts

Polygons

In geometry, a figure that lies in a plane is called a plane figure. Recall that a *polygon* is a closed plane figure formed by three or more line segments called *sides*. Each side intersects exactly two sides, one at each *vertex*, so that no two sides with a common vertex are collinear. You can name a polygon by listing the vertices in consecutive order.

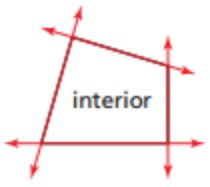


polygon *ABCDE*

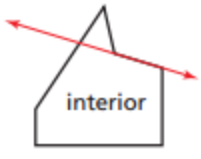
Number of sides	Type of polygon
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon
8	Octagon
9	Nonagon
10	Decagon
12	Dodecagon
n	*n*-gon

The number of sides determines the name of a polygon, as shown in the table.

You can also name a polygon using the term *n*-gon, where *n* is the number of sides. For instance, a 14-gon is a polygon with 14 sides.



convex polygon



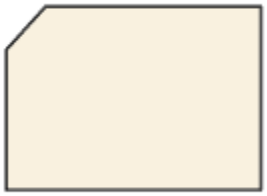
concave polygon

A polygon is *convex* when no line that contains a side of the polygon contains a point in the interior of the polygon. A polygon that is not convex is *concave*.

Examples: Classify the polygon by the number of sides. Tell whether it is *convex* or *concave*.

WE DO

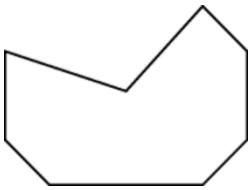
1a.



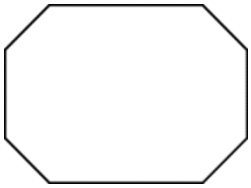
2a.

YOU DO

1b.



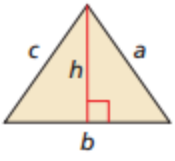
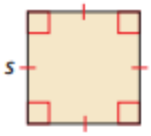
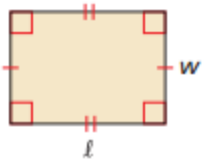
2b.



Finding Perimeter and Area in the Coordinate Plane

You can use the formulas given below and the Distance Formula to find the perimeters and areas of polygons in the coordinate plane.

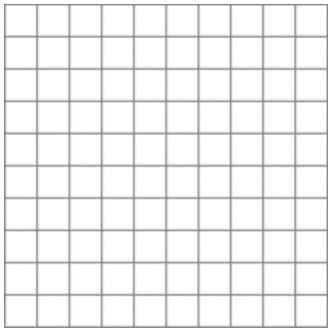
Perimeter and Area

Triangle	Square	Rectangle
		
$P = a + b + c$	$P = 4s$	$P = 2\ell + 2w$
$A = \frac{1}{2}bh$	$A = s^2$	$A = \ell w$

Examples: Find the perimeter of the polygon with the given vertices.

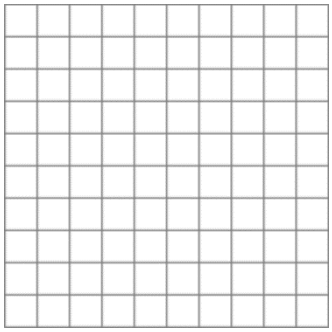
WE DO

$P(-1, 4)$, $Q(2, 4)$, and $R(2, -1)$



YOU DO

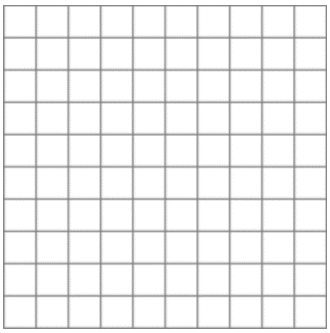
$J(-4, 1)$, $K(-4, -2)$, $L(6, -2)$, $M(6, 1)$



Examples: Find the area of the polygon with the given vertices.

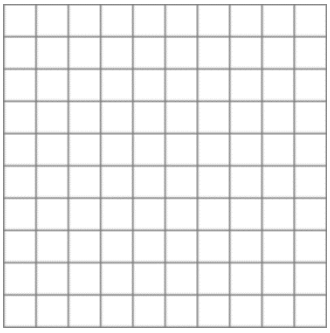
WE DO

$A(1, 3)$, $B(3, -3)$, and $C(-2, -3)$



YOU DO

$N(-1, 1)$, $P(2, 1)$, $Q(2, -2)$, $R(-1, -2)$



Assignment	

1.5 Explore angles. **Date:**

Define Vocabulary:

angle

vertex

sides of an angle

interior of an angle

exterior of an angle

measure of an angle

acute angle

right angle

obtuse angle

straight angle

congruent angles

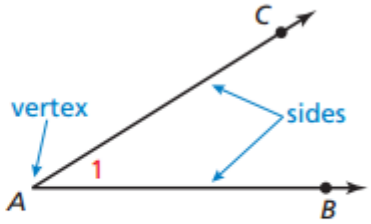
angle bisector

Naming Angles

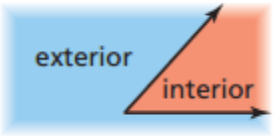
An **angle** is a set of points consisting of two different rays that have the same endpoint, called the **vertex**. The rays are the **sides** of the angle.

You can name an angle in several different ways.

- Use its vertex, such as $\angle A$.
- Use a point on each ray and the vertex, such as $\angle BAC$ or $\angle CAB$.
- Use a number, such as $\angle 1$.

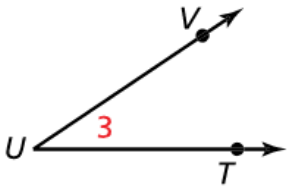


The region that contains all the points between the sides of the angle is the **interior of the angle**. The region that contains all the points outside the angle is the **exterior of the angle**.

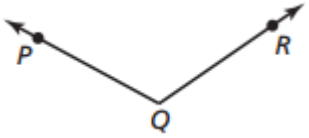


Examples: Write three names for the angle.

WE DO



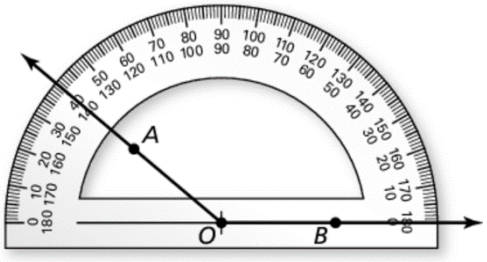
YOU DO



Postulate 1.3 Protractor Postulate

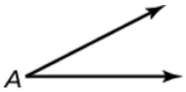
Consider $\overleftrightarrow{OB}$ and a point A on one side of $\overleftrightarrow{OB}$. The rays of the form $\overrightarrow{OA}$ can be matched one to one with the real numbers from 0 to 180.

The **measure** of $\angle AOB$, which can be written as $m\angle AOB$, is equal to the absolute value of the difference between the real numbers matched with $\overrightarrow{OA}$ and $\overrightarrow{OB}$ on a protractor.



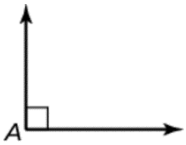
Core Concepts

Types of Angles



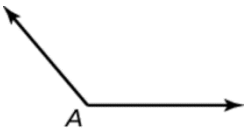
acute angle

Measures greater than $0°$ and less than $90°$



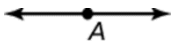
right angle

Measures $90°$



obtuse angle

Measures greater than $90°$ and less than $180°$

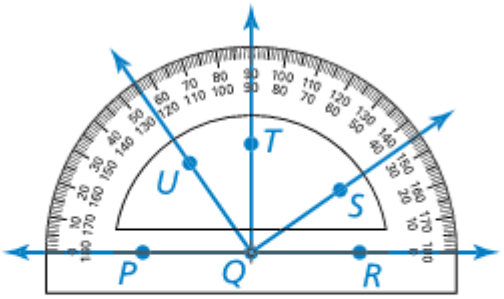


straight angle

Measures $180°$

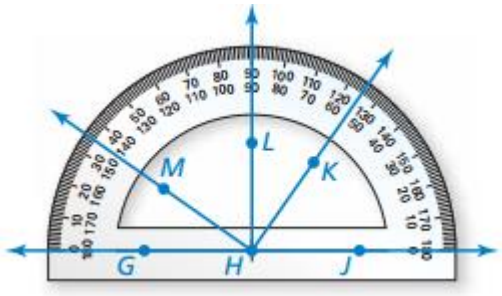
Examples: Find the measure of each angle. Then classify each angle.

WE DO



a. $\angle RQU$
b. $\angle TQU$
c. $\angle UQS$

YOU DO



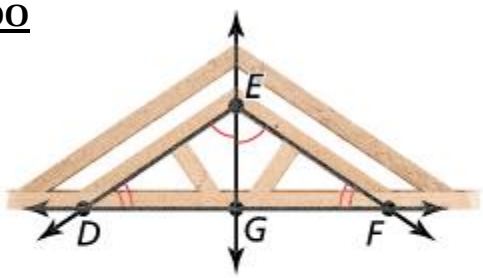
a. $\angle JHM$

b. $\angle MHK$

c. $\angle MHL$

Examples:

WE DO



a. Identify the congruent angles in the roof frame.

b. $m\angle EDG = 40°$. What is $m\angle EFG$?

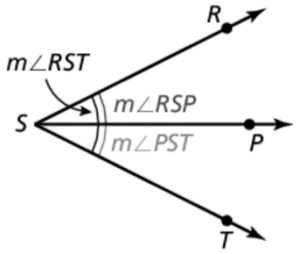
Assignment	

1.5 Day 2 Angle addition postulate. **Date:**

Postulate 1.4 Angle Addition Postulate

Words If P is the interior of $\angle RST$, then the measure of $\angle RST$ is equal to the sum of the measures of $\angle RSP$ and $\angle PST$.

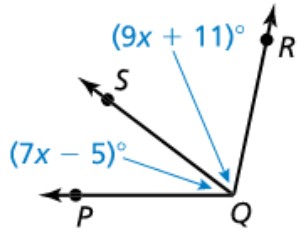
Symbols If P is in the interior of $\angle RST$, then $m\angle RST = m\angle RSP + m\angle PST$.



Examples:

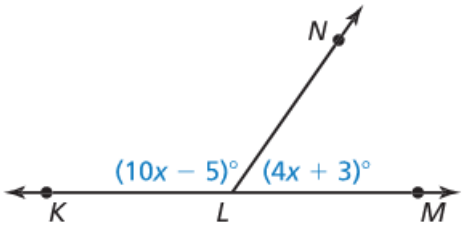
WE DO

Given that $m\angle PQR = 102°$, find $m\angle SQR$ and $m\angle PQS$.



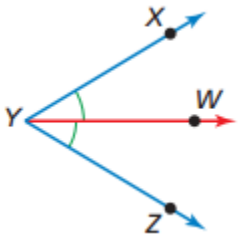
YOU DO

Given that $\angle KLM$ is a straight angle, find $m\angle KLN$ and $m\angle NLM$.



Bisecting Angles

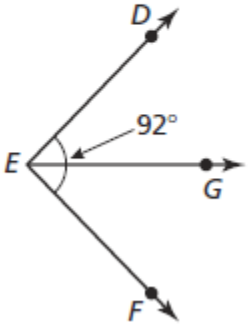
An **angle bisector** is a ray that divides an angle into two angles that are congruent. In the figure, $\overrightarrow{YW}$ bisects $\angle XYZ$, so $\angle XYW \cong \angle ZYW$.



Examples:

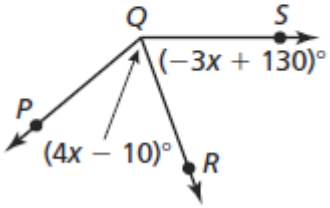
WE DO

$\overrightarrow{EG}$ bisects $\angle DEF$.
Find $m\angle DEG$ and $m\angle GEF$.



YOU DO

$\overrightarrow{QR}$ bisects $\angle PQS$.
Find $m\angle PQR$ and $m\angle PQS$.



Assignment	

1.6 Identify complementary, supplementary, linear pairs and vertical angles. Date: _____

Define Vocabulary:

complementary angles

supplementary angles

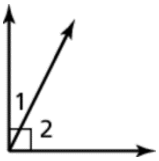
adjacent angles

linear pair

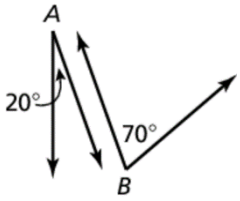
vertical angles

Core Concepts

Complementary and Supplementary Angles



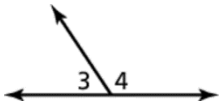
$\angle 1$ and $\angle 2$



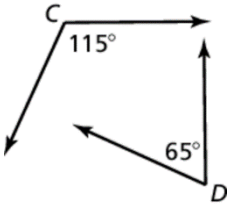
$\angle A$ and $\angle B$

complementary angles

Two positive angles whose measures have a sum of 90°. Each angle is the *complement* of the other.



$\angle 3$ and $\angle 4$



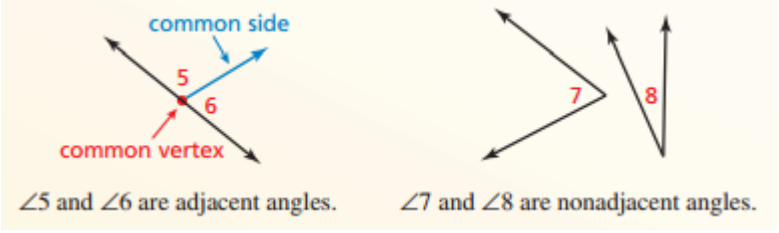
$\angle C$ and $\angle D$

supplementary angles

Two positive angles whose measures have a sum of 180°. Each angle is the *supplement* of the other.

Adjacent Angles

Complementary angles and supplementary angles can be *adjacent angles* or *nonadjacent angles*. **Adjacent angles** are two angles that share a common vertex and side, but have no common interior points.

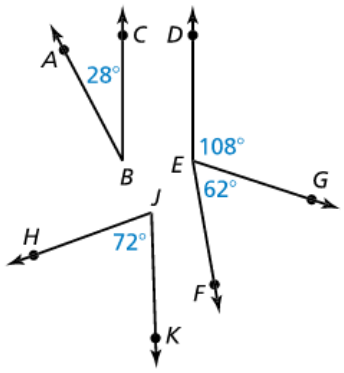


$\angle 5$ and $\angle 6$ are adjacent angles. $\angle 7$ and $\angle 8$ are nonadjacent angles.

Examples:

WE DO

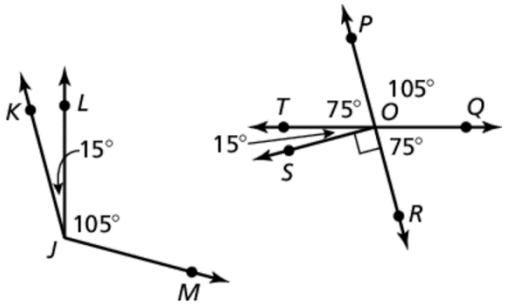
In the figure, name a pair of complementary angles, a pair of supplementary angles, and a pair of adjacent angles.



YOU DO

1. Name the pair(s) of adjacent complementary angles.

2. Name the pair(s) of nonadjacent supplementary angles.



Examples: Find the angle measure.

WE DO

a. $\angle 5$ is a complement of $\angle 3$, and $m\angle 3 = 53°$. Find $m\angle 5$.

b. $\angle 4$ is a supplement of $\angle 2$, and $m\angle 4 = 29°$. Find $m\angle 2$.

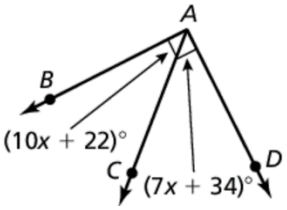
YOU DO

a. $\angle A$ is a complement of $\angle B$ and $m\angle A = 36°$. Find $m\angle B$.

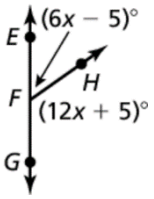
b. $\angle C$ is a supplement of $\angle D$ and $m\angle D = 117°$. Find $m\angle C$.

Examples: Find the measure of each angle.

WE DO

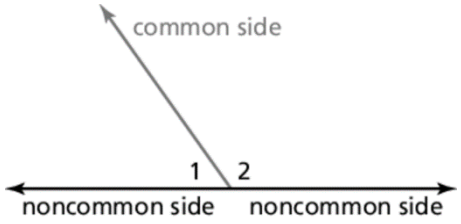


YOU DO



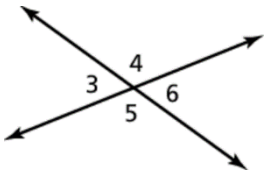
Linear Pairs and Vertical Angles

Two adjacent angles are a **linear pair** when their noncommon sides are opposite rays. The angles in a linear pair are supplementary angles.



$\angle 1$ and $\angle 2$ are a linear pair.

Two angles are **vertical angles** when their sides form two pairs of opposite rays.

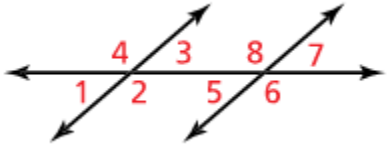


$\angle 3$ and $\angle 6$ are vertical angles.

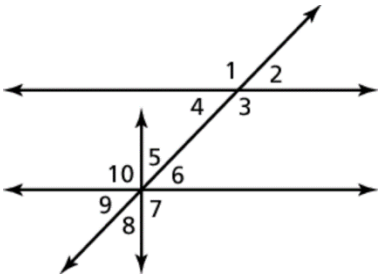
$\angle 4$ and $\angle 5$ are vertical angles.

Examples: Identify all linear pairs and vertical angles.

WE DO



YOU DO



Examples:

WE DO

Two angles form a linear pair. The measure of one angle is eight times the measure of the other angle. Find the measure of each angle.

Assignment	