Lesson 3

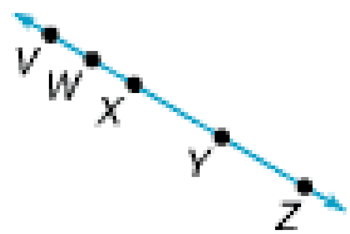
Glencoe Geometry Chapter 1.6 & 1.7

Angles: Exploration & Relationships

By the end of this lesson, you should be able to

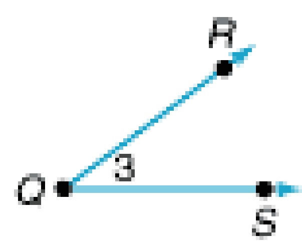
1. Identify angles and ________________ angles.
2. Use the Angle Addition Postulate to find the ____________ of angles.
3. Identify and use congruent angles and the _____________ of an angle.
4. Identify and use special _______________ of angles.
5. Identify your favorite Math television program __________.

Remember from Lesson 1 that a ray has one fixed end and extends indefinitely in one direction. For example $\overrightarrow{YV}$ in the figure at right. Since direction matters, $\overrightarrow{YV}$ and $\overrightarrow{YZ}$ are called _____________ rays, but they share a common endpoint. Opposite rays are always collinear.

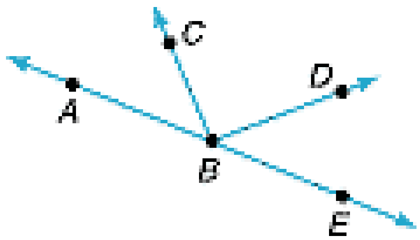


An angle is usually formed by two non-collinear rays with a common endpoint. The common endpoint is called the ________.

Give some names for the angle at right:



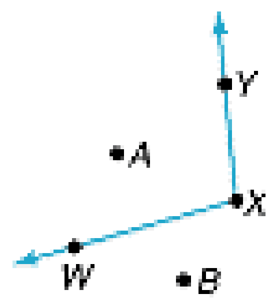
Notice in the last diagram, there was only one angle. You must be more careful when naming different angles that share a common vertex. In the diagram below, you CANNOT name either of the angle as just $\angle B$!!! What *are* some names?



Angle $\angle ABE$ or $\angle EBA$ is called a ________________ angle, since $\overrightarrow{BA}$ and $\overrightarrow{BE}$ are opposites.

An angle separates a plane into three distinct parts:

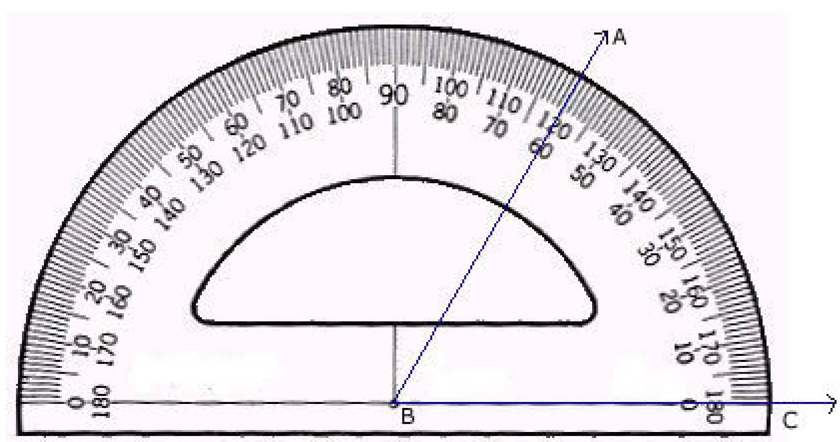
1. The ____________ of the angle.
2. The ____________ of the angle.
3. and the angle itself.



We typically measure angles in ________ using a ____________.

*All angles this year will be in degrees. The degree symbol is sometimes used, but without it, we infer that the measure is still in degrees:

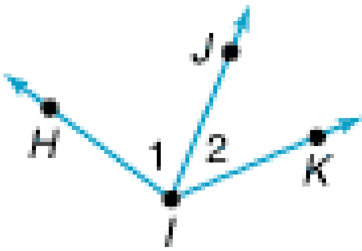
$$85^\circ = 85$$



http://z.about.com/d/math/1/0/f/1/protractor.jpg

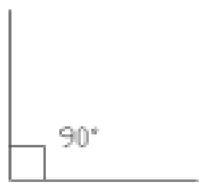
Using the inner scale, we can say that the degree measure of $\angle ABC$ is 60, or equivalently, $m\angle ABC = 60$

By the Angle Addition Postulate, in the figure below,
$m\angle HIJ + m\angle JIK = m\angle HIK$ . . . . . . Duhhhh!!

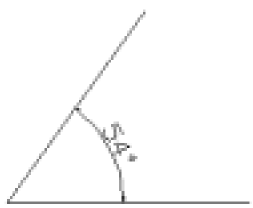


So, what is $m\angle HIJ$ if $m\angle JIK = 45^\circ$ and $m\angle HIK = 100^\circ$?

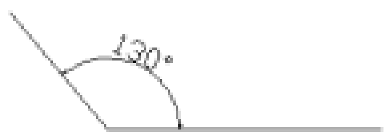
We can also classify individual angles by their measures:



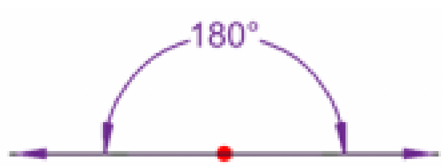
right angle = 90



acute angle < 90



obtuse angle > 90



straight angle = 180

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_____________ angles have the same measure. Which of the angles above are congruent to all others in the same class?

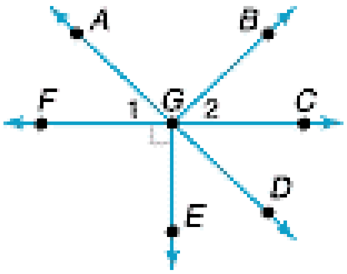
Two angles that add to 180 are said to be _____________ angles.

Two angles that add to 90 are said to be ______________ angles.

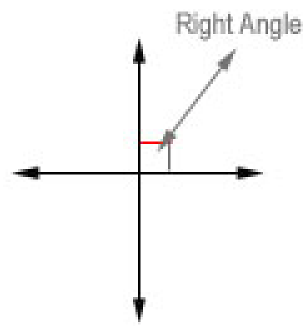
An angle _________ is a ray that divides and angle into two congruent angles.

Example:

If $\overrightarrow{GD}$ bisects $\angle CGE$, which angle is congruent to $\angle CGD$?

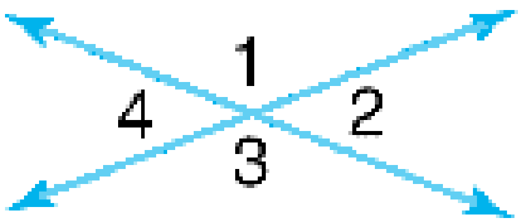


What other angle is congruent to $\angle CGE$?



http://math.about.com/library/graphics/perpendicular.jpg

When two lines intersect, they form four angles. When they intersect to form four right angles, we say the lines are ___________________, and denoted by the $\perp$ symbol Not all lines are perpendicular to each other, though.



When two lines intersect, it is useful to classify angles by their relationship to other angles.

_____________ **Angles**—have a common vertex and a common side with no common interior points

Ex) $\angle 1 \& \angle 2,\ \angle 2 \& \angle 3,\ \angle 3 \& \angle 4,\ \angle 4 \& \angle 1$

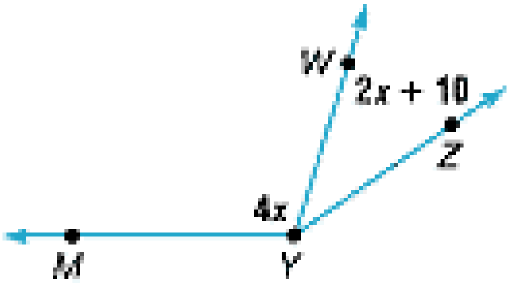
_____________ **Angles**—non-adjacent angles across from each other. Vertical angles are congruent!!!

Ex) $\angle 1 \& \angle 3,\ \angle 2 \& \angle 4$

__________ **Pair**—adjacent angles formed by opposite rays. Linear pairs will always be supplements of each other. Which angle above are linear pairs?

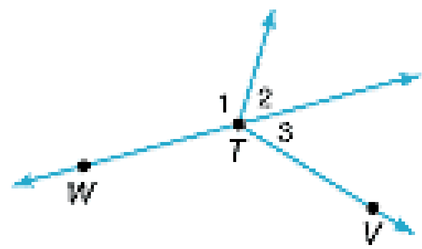
Example:

If $m\angle MYZ = 160$, what is $m\angle MYW$?



Example:

Name two angles that are adjacent to $\angle WTV$.



A. $\angle 1$ and $\angle 2$ B. $\angle 2$ and $\angle 3$

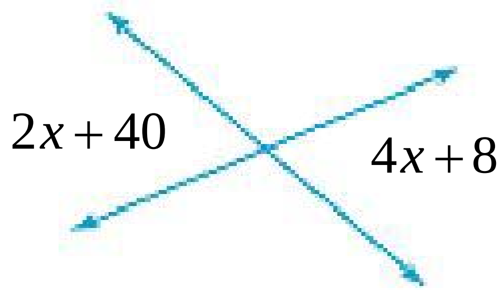
C. $\angle WTV$ and $\angle 3$ D. $\angle 1$ and $\angle 3$

Example:

If $m\angle 1 = 2x$ and $m\angle 2 = 4x$. Find the value of x if $\angle 1$ and $\angle 2$ are complementary.

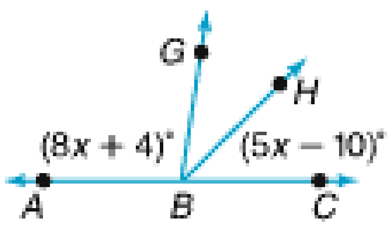
Example:

Find the value of x.



Example:

If $m\angle ABC = 180$ and $x = 12$, what is $m\angle GBH$?



Say What??!!

Circle the right Answer:

1. Angles are measured in units called (sides) or (degrees).
2. In Figure 1, $\angle 2$ and $\angle 3$ are (complementary) or (supplementary) angles.
3. A (compass) or (protractor) is used to find the measure of an angle.
4. In Figure 2, the two angles shown are (supplementary) or (congruent) angles
5. In Figure 3, $\angle 5$ and $\angle 6$ are (vertical) or (adjacent) angles.
6. Perpendicular lines intersect to form (obtuse) or (right) angles.
7. In Figure 3, A is called (a side) or (the vertex) of $\angle 6$.
8. In Figure 1, $\angle 1$ and $\angle 4$ form a (linear pair) or (right angle).
9. In Figure 4, $\overrightarrow{KM}$ is the (vertex) or (bisector) of $\angle JKL$.

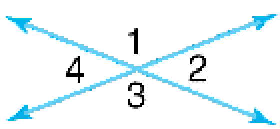


Figure 1

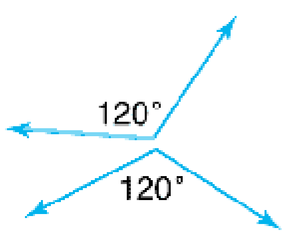


Figure 2

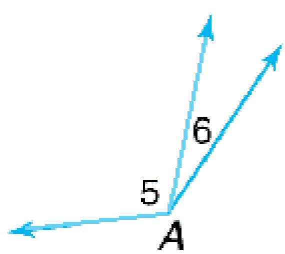


Figure 3

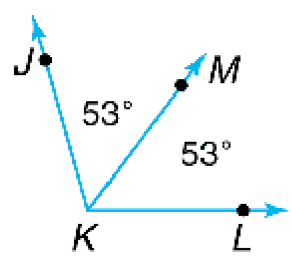


Figure 4

*unless otherwise noted, all images are created using TI-Interactive Software or from www.Glencoe.com