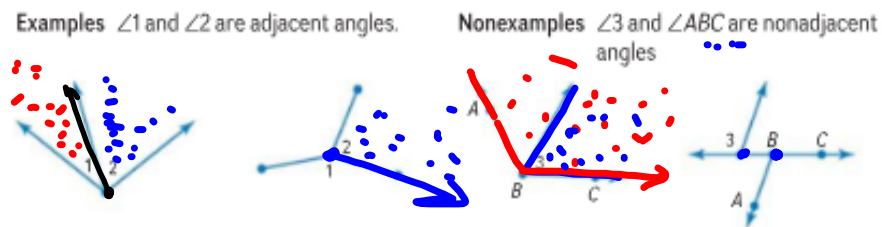


Section 1.5 Angle Relationships

Pairs of Angles: Some pairs of angles are special because of how they are positioned in relationship to each other.

Adjacent Angles are two angles that lie in the same plane and have a common vertex and a common side, but no common interior points.



A **linear pair** is a pair of adjacent angles with non-common sides that are opposite rays.



Vertical angles are two nonadjacent angles formed by two intersecting lines.



Name an angle pair that satisfies each condition.

a. two acute adjacent angles

$\angle OJN, \angle MJN$
 $\angle LJM, \angle MJN$

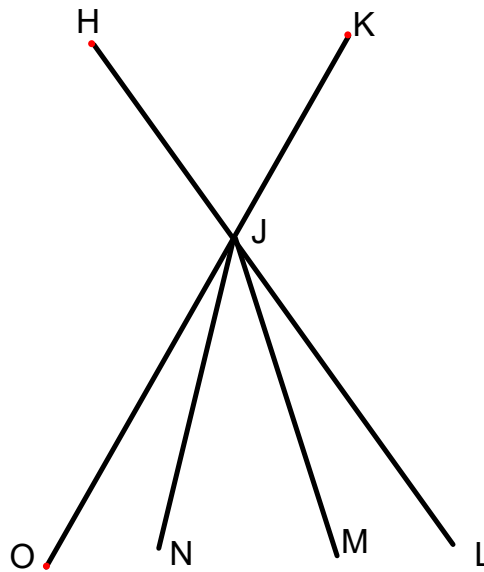
b. two obtuse vertical angles

$\angle HJO, \angle KJL$

c. a linear pair

$\angle HJK, \angle KJL$

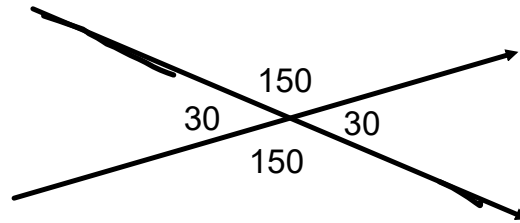
d. two acute vertical angles. $\angle HJK, \angle OJL$



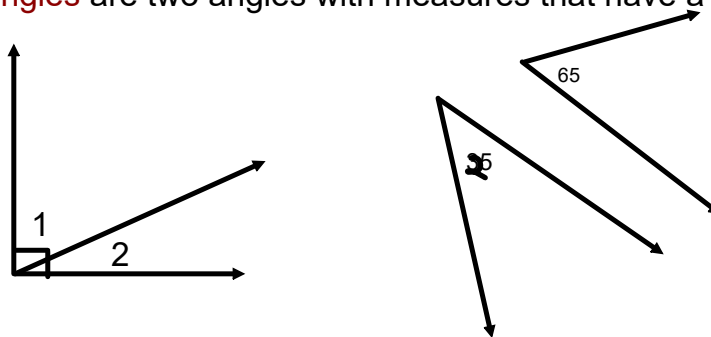
Some pairs of angles are special because of the relationship between their angle measures.

Angle Pair Relationships

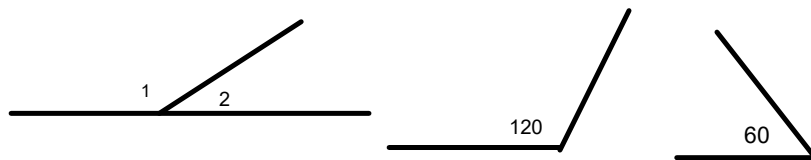
Vertical angles are congruent.



Complementary angles are two angles with measures that have a sum of 90 degrees.



Supplementary angles are two angles with measures that have a sum of 180 degrees.



Angles in a linear pair are supplementary.

	Comp	Supp?
80°	10°	100°
65°	25°	115°
100°	—	80°

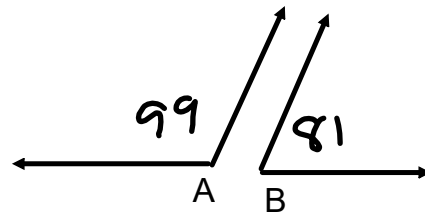
Example:

Find the measures of two supplementary angles if the **difference** in the measures of the two angles is 18.

Let $\angle A = x$, then $\angle B =$

$$\angle A + \angle B = 180$$

$$\begin{aligned} x + x - 18 &= 180 \\ 2x &= 198 \\ x &= 99 \end{aligned}$$

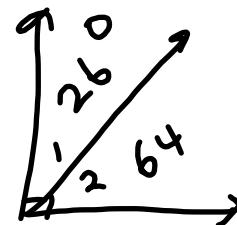


Example: Find the measures of two complementary angles if the measure of the larger angle is 12 more than twice the measure of the smaller angle.

$$x + \underline{12 + 2x} = 90$$

$$3x = 78$$

$$x = 26$$



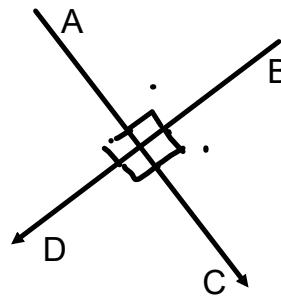
Perpendicular Lines

Lines segments, or rays that form right angles are **perpendicular**.

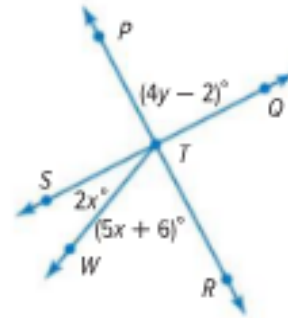
Symbol \perp

$AC \perp BD$

$AC \perp BD$



Example: Find x and y so that PR and SQ are perpendicular.

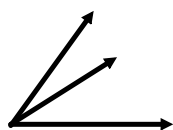


Example:

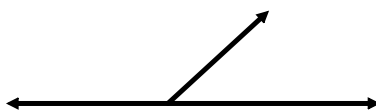
suppose $m\angle D = 3x - 12$. Find x so that $\angle D$ is a right angle.

When you look at a diagram you can conclude the following items are true:

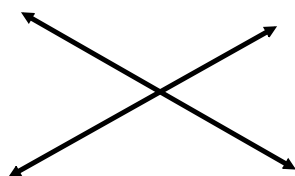
1. angles are adjacent



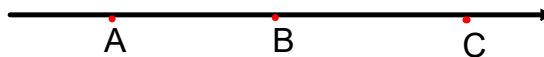
2. adjacent supplementary angles



3. vertical angles

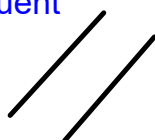


4. Points are collinear.

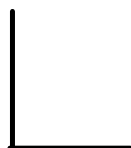


When you look at a diagram you **cannot** conclude that:

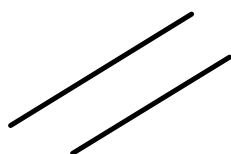
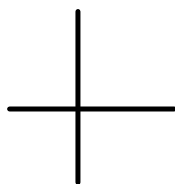
1 angles or segments are congruent



2 an angle is a right angle

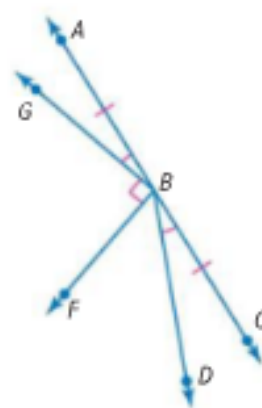


3. lines are parallel or perpendicular



Determine whether each statement can be assumed from the figure.

- a. $\angle DBC$ and $\angle ABG$ are complementary.
- b. $\angle ABD$ and $\angle CBD$ are a linear pair.
- c. BF is perpendicular to BG
- d. $\angle ABF$ and $\angle FBC$ are supplementary.
- e. $\angle ABG$ and $\angle GBD$ are adjacent angles.



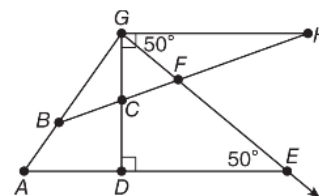
NAME _____ DATE _____ PERIOD _____

1-5 Practice

Angle Relationships

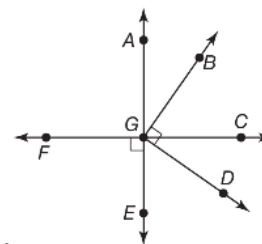
Name an angle or angle pair that satisfies each condition.

1. Name two obtuse vertical angles.
2. Name a linear pair with vertex B .
3. Name an angle not adjacent to, but complementary to $\square FGC$.
4. Name an angle adjacent and supplementary to $\square DCB$.
5. **ALGEBRA** Two angles are complementary. The measure of one angle is 21 more than twice the measure of the other angle. Find the measures of the angles.
6. **ALGEBRA** If a supplement of an angle has a measure 78 less than the measure of the angle, what are the measures of the angles?



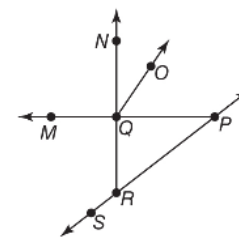
ALGEBRA For Exercises 7-8, use the figure at the right.

7. If $m\square FGE = 5x + 10$, find the value of x so that $\overrightarrow{FC} \perp \overrightarrow{AE}$.
8. If $m\square BGC = 16x - 4$ and $m\square CGD = 2x + 13$, find the value of x so that $\square BGD$ is a right angle



Determine whether each statement can be assumed from the figure. Explain.

9. $\square NQO$ and $\square OQP$ are complementary.
10. $\square SRQ$ and $\square QRP$ is a linear pair.
11. $\square MQN$ and $\square MQR$ are vertical angles.



12. **STREET MAPS** Darren sketched a map of the cross streets nearest to his home for his friend Miguel. Describe two different angle relationships between the streets.

