Vocabulary Start-Up

An angle is formed by two rays that share a common endpoint. The **vertex** is the point where the two rays meet.

Complete the table by drawing the hands of a clock to represent each angle.

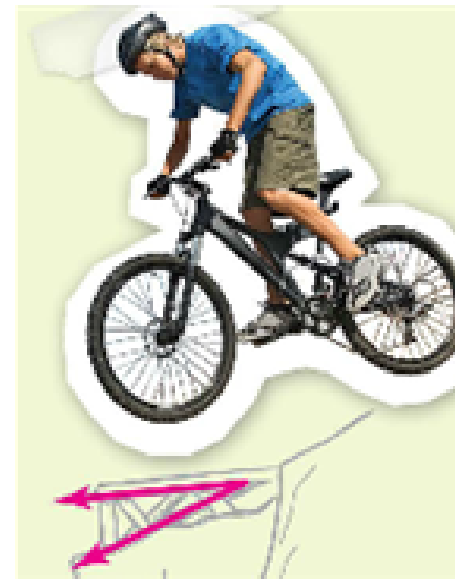| Type of Angle			
Right	**Acute**	**Obtuse**	**Straight**
exactly 90°	less than 90°	greater than 90°	exactly 180°

Real-World Link

The angle formed by a bike ramp is shown.

1. What type of angle is formed?

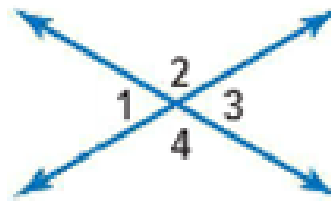   _____

2. Estimate the measure of the angle.

Name and Identify Angles

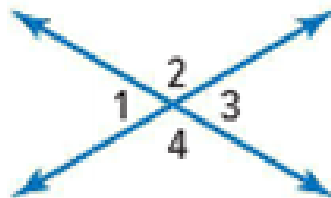| Words	Models	Symbols
Two angles are **vertical** if they are opposite angles formed by the intersection of two lines. Vertical angles are **congruent** or have the same measure.	$\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$	$\angle 1 \cong \angle 3$ $\angle 2 \cong \angle 4$
Two angles are **adjacent** if they share a common vertex, a common side, and do not overlap.		Adjacent angle pairs are $\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, and $\angle 4$ and $\angle 1$.

You can name an angle by its vertex and by its points.

Example

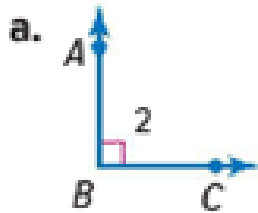**1. Name the angle shown at the right. Then classify it as *acute, right, obtuse,* or *straight.***
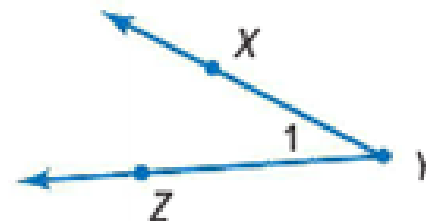
- Use the vertex as the middle letter and a point from each side, ∠XYZ or ∠ZYX.

- Use the vertex only, ∠Y.

- Use a number, ∠1.

Since the angle is less than 90°, it is an acute angle.

Name each angle in four ways. Then classify each angle as *acute, right, obtuse,* or *straight.*

a.

A

2

B   C

b.

T

3

R   S

c.

4   N

M

L

∠ABC

∠CBA

∠B

∠2
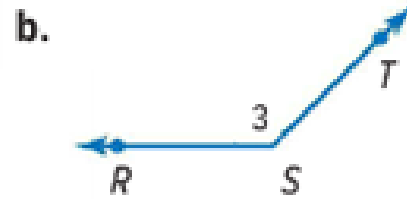
Right

∠RST

∠TSR

∠3

∠S

Obtuse
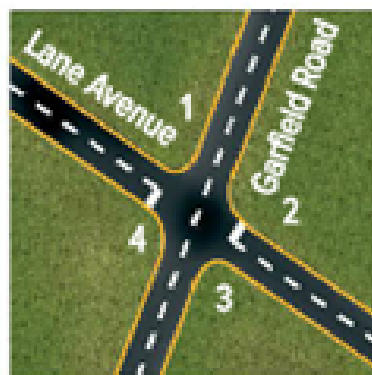
∠LMN

∠NML

∠4

∠m

Straight

$\angle C = ?$

$\angle ACF$
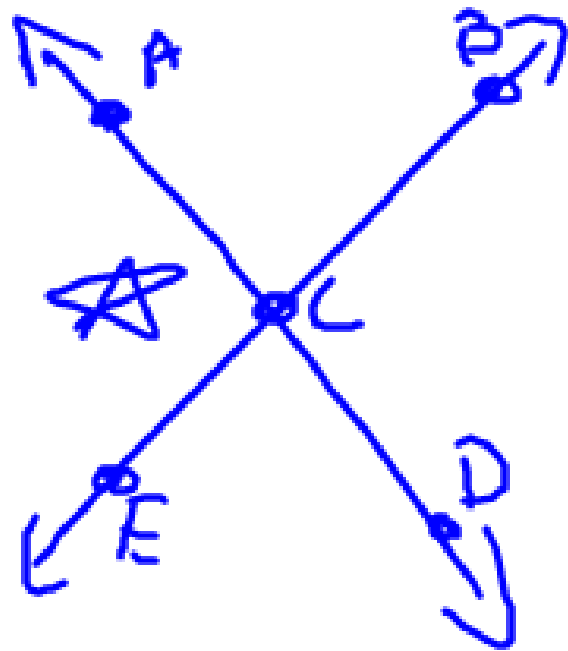
Example

2. **Identify a pair of vertical angles and adjacent angles in the diagram at the right. Justify your response.**

Since ∠2 and ∠4 are opposite angles formed by the intersection of two lines, they are vertical angles.

Since ∠1 and ∠2 share a common side and vertex, and they do not overlap, they are adjacent angles.

Got it? Do this problem to find out.

d. Refer to the diagram in Example 2. Identify different pairs of vertical and adjacent angles. Justify your response.

Vertical
_____
∠1 and ∠3

Adjacent
_____
∠3 and ∠4
∠2 and ∠3
∠1 and ∠4

Find a Missing Measure

You can use what you learned about vertical and adjacent angles to find the value of a missing measure.

Example

3. **What is the value of *x* in the figure?**

The angle labeled $(2x + 2)°$ and the angle labeled 130° are vertical angles.

Since vertical angles are congruent, $(2x + 2)°$ equals 130°.

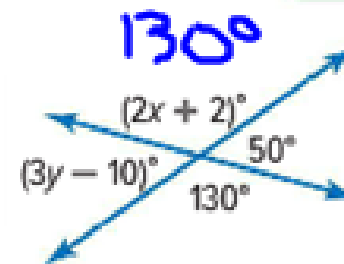$2x + 2 = 130$ Write the equation.

$\underline{-2 = -2}$ Subtract 2 from each side.

$\dfrac{2x}{2} = \dfrac{128}{2}$ Divide each side by 2.

$x = 64$

So, the value of *x* is 64.

130°

$(2x + 2)°$

50°

$(3y - 10)°$

130°

e. What is the value of y in the figure in Example 2?

$$3y - 10 = 50$$
$$\underline{ +10 \qquad +10}$$
$$\frac{3y}{3} = \frac{60}{3}$$

$$\boxed{y = 20}$$

In the figure:
$(2x + 2)°$
$50°$
$(3y - 10)°$
$130°$

$$3(20) - 10$$
$$60 - 10$$
$$\boxed{50°}$$