Goals: *Classify angles as acute, obtuse, or right
*Use angle relationships to find missing angle measures

Acute angle: angle less than $90^{\circ}$

Obtuse angle: angle more than $90^{\circ}$

Right angle: angle equal to $90^{\circ}$

## Classify the following types of angles:

Ex:


Acute

Ex:

right


Obtuse and Acute

Complementary Angles: Angles whose sum is $90^{\circ}$

Are the two angles complementary?

Ex: $30^{\circ}$ and $60^{\circ}$

Yes

Ex: $25^{\circ}$ and $55^{\circ}$

No

Ex: $45^{\circ}$ and $45^{\circ}$
Yes

Find missing angles:
Ex:


Ex: $\angle A$ and $\angle B$ are complementary. Find $\angle A$ if $\angle B=61^{\circ}$. $90-61=29^{\circ}$

Ex:


$$
\begin{array}{r}
x+x+30=90 \\
2 x+30=90 \\
\frac{-30}{}=-30 \\
\frac{2 x}{2}=\frac{60}{2} \\
x=30
\end{array}
$$

Supplementary Angles: Angles whose sum is $180^{\circ}$

Are the two angles supplementary?
Ex: $120^{\circ}$ and $60^{\circ}$
Yes
Ex: $110^{\circ}$ and $50^{\circ}$
No

Ex: $\angle 1=y^{\circ} \quad \angle 2=2 y^{\circ}$
$\angle 1$ and $\angle 2$ are complementary. Find $\angle 1$ and $\angle 2$.

$$
\begin{array}{r}
y+2 y=90 \\
\frac{3 y}{3}=\frac{90}{3} \\
y=30
\end{array}
$$

Ex: $72^{\circ}$ and $108^{\circ}$
Yes

## Ex:



$$
180-110=70^{\circ}
$$

Ex: $\angle A$ and $\angle B$ are supplementary. $\angle A=3 x^{\circ}$ and $\angle B=6 x^{\circ}$. Find both angles.

$$
\begin{aligned}
3 x+6 x & =180 \\
9 x & =180 \\
x & =20
\end{aligned}
$$

Ex:


Adjacent angles: Two angles that share a common ray

Ex: Name two adjacent angles.


Vertex: The endpoint at which rays begin

Ex: Name the vertex of the previous example. $B$

Vertical angles: Two angles located opposite each other, formed by intersecting lines. *Vertical angels are congruent!


Ex: Name two sets of vertical angles
$\angle A$ and $\angle C$
$\angle D$ and $\angle B$

Find the value of $x$.

Ex:


$$
x=55
$$

Ex:


$$
\begin{aligned}
x+12 & =25 \\
x & =13
\end{aligned}
$$

Parallel lines: Lines that never intersect

Transversal: A line that intersects parallel lines.

When parallel lines are intersected by a _transversal $\qquad$ _ 8 angles are formed.

There are $\qquad$ 4 pairs. Each pair is _congruent $\qquad$ , meaning they have the same measure.


Vertical Angles: Two angles located opposite each other on intersecting lines
$\angle 2$ and $\angle 3$
$\angle 5$ and $\angle 8$
$\angle 6$ and $\angle 7$
$\angle 1$ and $\angle 4$

Corresponding Angles: Two angles in the "same spot" on separate parallel lines. (Same room, different house)
$\angle 8$ and $\angle 4$
$\angle 2$ and $\angle 6$
$\angle 1$ and $\angle 5$
$\angle 3$ and $\angle 7$

Alternate Exterior Angles: Two angles outside the parallel lines on opposite sides of the transversal that have the same measure
$\angle 1$ and $\angle 8$
$\angle 2$ and $\angle 7$


Alternate Interior Angles: Two angles inside the parallel lines, on opposite sides of the transversal that have the same measure.
$\angle 3$ and $\angle 6$
$\angle 4$ and $\angle 5$

Find the missing angle measures:


$$
\begin{aligned}
& m \angle 1=120^{\circ} \\
& m \angle 2=60^{\circ} \\
& m \angle 3=60^{\circ} \\
& m \angle 4=120^{\circ} \\
& m \angle 5=120^{\circ} \\
& m \angle 6=60^{\circ} \\
& m \angle 8=120^{\circ}
\end{aligned}
$$

Find the missing angle measures:


$$
\begin{aligned}
& m \angle A=75^{\circ} \\
& m \angle B=105^{\circ} \\
& m \angle C=105^{\circ} \\
& m \angle D=75^{\circ} \\
& m \angle E=75^{\circ} \\
& m \angle F=105^{\circ} \\
& m \angle G=105^{\circ}
\end{aligned}
$$

