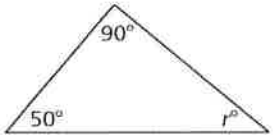
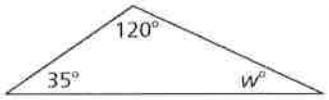
1.5A - Angles

Find the value of the variable.

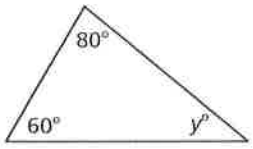
1. $r + 50 + 90 = 180$
$r + 140 = 180$
$-140 \quad -140$
$r = 40$



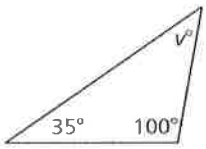
2. $w + 120 + 35 = 180$
$w + 155 = 180$
$-155 \quad -155$
$w = 25°$



3. $y + 80 + 60 = 180$
$y + 140 = 180$
$-140 \quad -140$
$y = 40$



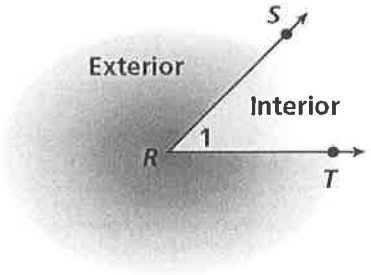
4. $w + 100 + 35 = 180$
$w + 135 = 180$
$-135 \quad -135$
$w = 45°$



Cumulative Warm Up

An **angle** is a figure formed by two rays, or sides, with a common endpoint called the **vertex** (plural: *vertices*).

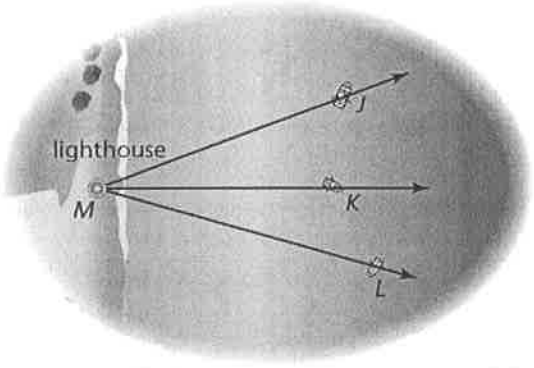
Angle Name
$\angle R$, $\angle SRT$, $\angle TRS$, or $\angle 1$



When using three points, the middle letter must represent the VERTEX

May 23-10:32 AM

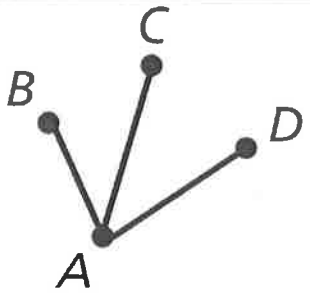
A lighthouse keeper measures the angles formed by the lighthouse at point *M* and three boats. Name three angles shown in the diagram.



∠JMK, ∠KML, ∠JML

Example 1

Naming Angles:



Angle on the Left:

∠BAC or ∠CAB

Angle on the Right:

∠CAD or ∠DAC

The Whole Angle:

∠BAD or ∠DAB

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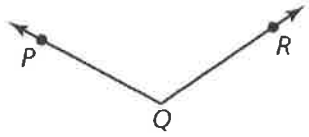
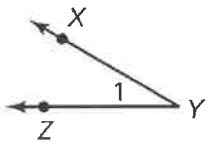
Write three names for the angle.

1.



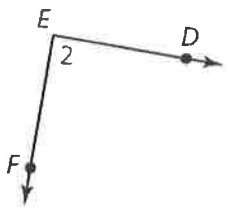
∠PQR
∠RQP
∠Q

2.



∠XYZ
∠ZYX
∠1

3.



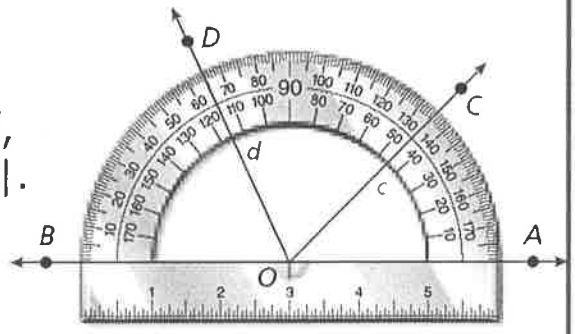
∠DEF
∠FED
∠2

Monitoring Progress 1-3

The **measure** of an angle is how wide it opens. It is measured in degrees.

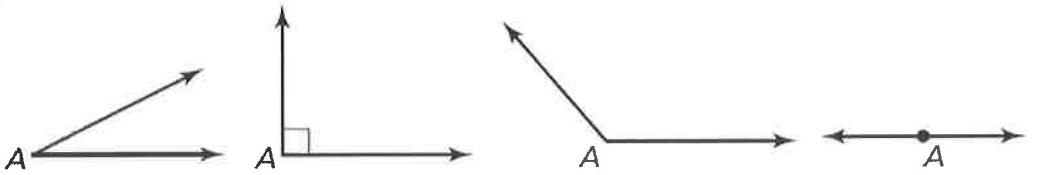
Since there are 360° in a circle, one **degree** is 1/360 of a circle.

If $\overrightarrow{OC}$ corresponds with c and $\overrightarrow{OD}$ corresponds with d, $m\angle DOC = |d - c|$ or $|c - d|$.



Postulate

Types of Angles

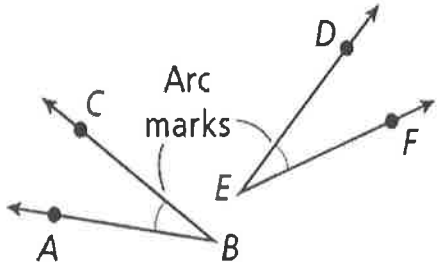


acute angle	right angle	obtuse angle	straight angle
Measures greater than 0° and less than 90°	Measures 90°	Measures greater than 90° and less than 180°	Measures 180°

Core Concept

Congruent angles are angles that have the same measure.

In the diagram, $m\angle ABC = m\angle DEF$, so you can write $\angle ABC \cong \angle DEF$. This is read as "angle ABC is congruent to angle DEF." *Arc marks* are used to show that the two angles are congruent.



May 23-10:38 AM

Find the measure of each angle.

Then classify each angle.

a. $\angle GHK$ **b.** $\angle JHL$ **c.** $\angle LHK$

a) $|180-55|$

$|125|$

125°

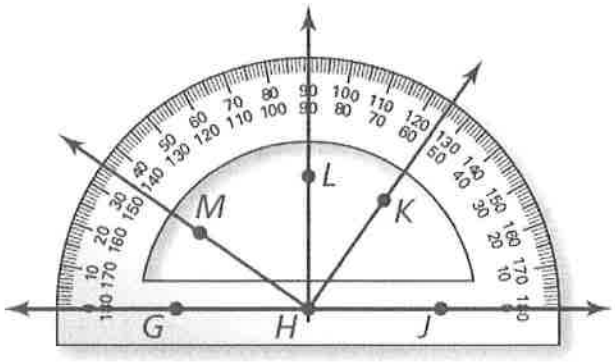
Obtuse

b) $|180-90|$

$|90|$

90°

Right



c) $|90-55|$

$|35|$

35° Acute

Example 2

Use the diagram to find the angle measure. Then classify the angle.

4. $\angle JHM$

$|180-35| = |145| = 145^\circ$

Obtuse

5. $\angle MHK$

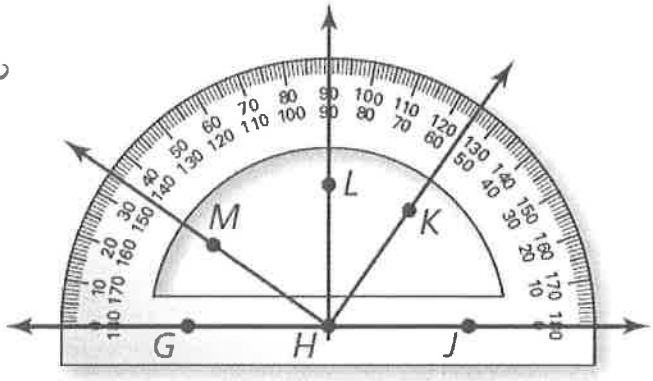
$|35-125| = |-90| = 90^\circ$

Right

6. $\angle MHL$

$|35-90| = |55| = 55^\circ$

Acute



Monitoring Progress 4-6

Homework

pg. 43 #3-14, 17-20

May 23-10:40 AM

1.5B - Angle Addition Postulate

- 1) Suppose S is between R and T. Solve for x.
  RS = 2x + 6, ST = 4x – 3 , RT = 5x + 12

2) B is the midpoint of segment AC, AB = 5x, BC = 3x + 4. Find AB, BC, and AC.

(1)

$5x + 12$

$RS + ST = RT$

$2x+6+4x-3 = 5x+12$

$6x+3 = 5x+12$

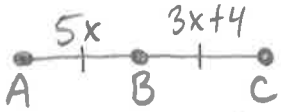
$-5x \quad -5x$

$x+3 = 12$

$-3 \quad -3$

$x = 9$

(2)



$AB = BC$

$5x = 3x+4$

$-3x \quad -3x$

$\frac{2x}{2} = \frac{4}{2}$

$x = 2$

$AB = 5(2) = 10$

$BC = 10$

$AC = 20$

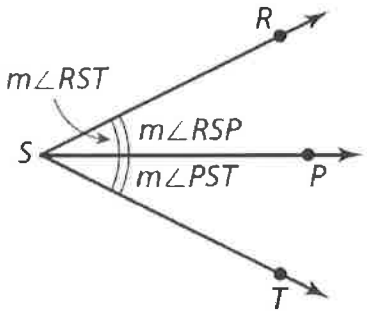
May 23-10:41 AM

Postulate 1.4 Angle Addition Postulate

Words If P is in 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

$$m\angle RST = m\angle RSP + m\angle PST.$$



EX1 $m\angle LKM + m\angle MKN = m\angle LKN$

$2x+10 + 4x-3 = 145$

$6x+7 = 145$

$-7 \quad -7$

$\frac{6x}{6} = \frac{138}{6}$

$x = 23$

$m\angle LKN = 2(23)+10$

$= 560$

$m\angle MKN = 4(23)-3$

$92-3$

$= 89^{0}$ Postulate

EX2 $m\angle KLN + m\angle NLM = m\angle KLM$

$10x-5 + 4x+3 = 180^{0}$

$14x-2 = 180$

$+2 \quad +2$

$\frac{14x}{14} = \frac{182}{14}$

$x = 13$

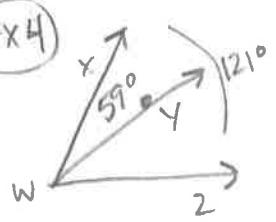
$m\angle KLN = 10(13)-5$

$= 125^{0}$

$m\angle NLM = 4(13)+3$

$= 55^{0}$

EX4



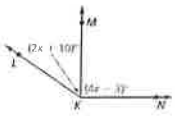
$m\angle XWY + m\angle YWZ = m\angle XWZ$

$59 + m\angle YWZ = 121^{0}$

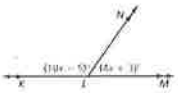
$-59 \quad -59$

$m\angle YWZ = 62^{0}$

Ex 1) Given that $m\angle LKN = 145°$, find $m\angle LKM$ and $m\angle MKN$.



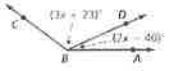
Ex 2) Given that $\angle KLM$ is a straight angle, find $m\angle KLN$ and $m\angle NLM$.



Ex 3) Given that $\angle EFG$ is a right angle, find $m\angle EFH$ and $m\angle HFG$.

Ex 4) Y is in the interior of angle XWZ. $m\angle XWZ = 121°$ and $m\angle XWY = 59°$. Find $m\angle YWZ$.

Ex 5) Given that $m\angle ABC = 143°$, find $m\angle ABD$ and $m\angle DBC$.



Example 4

EX3 $m\angle EFH + m\angle HFG = m\angle EFG$

$2x+2 + x+1 = 90$

$3x+3 = 90$

$-3 \quad -3$

$\frac{3x}{3} = \frac{87}{3}$

$x = 29$

$m\angle EFH = 2(29)+2 = 60$

$m\angle HFG = 29+1 = 30$

EX5 $m\angle CBD + m\angle DBA = m\angle ABC$

$3x+23 + 2x-40 = 143$

$5x-17 = 143$

$\frac{5x}{5} = \frac{160}{5}$

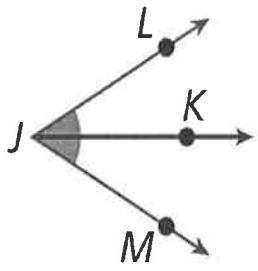
$x = 32$

$m\angle CBD = 3(32)+23 = 119$

$m\angle DBA = 2(32)-40 = 24$

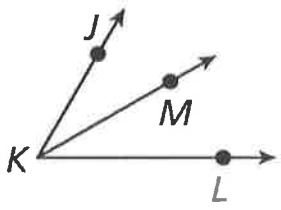
An **angle bisector** is a ray that divides an angle into two congruent angles.

JK bisects $\angle LJM$; thus $\angle LJK \cong \angle KJM$.



May 23-10:44 AM

Ex 1) $\overrightarrow{KM}$ **bisects** $\angle JKL$, $m\angle JKM = (4x + 6)°$, **and** $m\angle MKL = (7x - 12)°$. **Find** $m\angle JKM$.



$m\angle JKM = m\angle MKL$

$4x + 6 = 7x - 12$

$-4x \quad -4x$

$6 = 3x - 12$

$+12 \quad +12$

$\frac{18}{3} = \frac{3x}{3}$ $x = 6$

$m\angle JKM = 4(6) + 6 = 30°$

Ex 2) $\overrightarrow{QS}$ **bisects** $\angle PQR$, $m\angle PQS = (5y - 1)°$, **and** $m\angle PQR = (8y + 12)°$. **Find** $m\angle PQS$.

$m\angle PQR = 2(m\angle PQS)$

$8y + 12 = 2(5y - 1)$

$8y + 12 = 10y - 2$

$12 = 2y - 2$

$+2 \quad +2$

$\frac{14}{2} = \frac{2y}{2}$ $7 = y$

$m\angle PQS = 5(7) - 1$

$= 35 - 1 = 34°$

Ex 3) $\overrightarrow{JK}$ **bisects** $\angle LJM$, $m\angle LJK = (-10x + 3)°$, **and** $m\angle KJM = (-x + 21)°$. **Find** $m\angle LJM$.

(SEE BELOW)

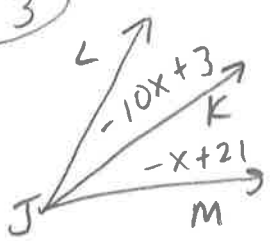
May 23-10:46 AM

Homework

Pg. 43 #25-30, 37-40, 47

Aug 31-10:35 AM

EX 3



$m\angle LJK = m\angle KJM$

$-10x+3 = -x+21$

$+10x \quad +10x$

$3 = 9x+21$

$-21 \quad -21$

$\frac{-18}{9} = \frac{9x}{9}$

$-2 = x$

$m\angle LJK = -10(-2)+3 = 23$

$m\angle LJM = 2(23) = 46^{\circ}$