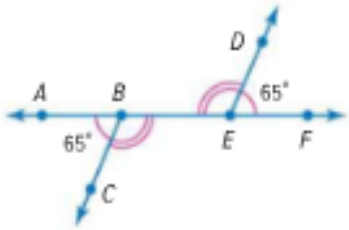
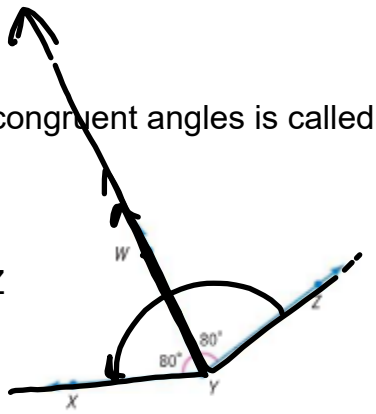
Congruent Angles

Angles with the same measure are congruent angles.



A ray that divides an angle into two congruent angles is called an angle bisector.

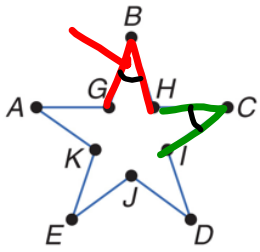
$\overrightarrow{YW}$ is the angle bisector of <XYZ



The sum of the measures of the two smaller angles equals the measure of the largest angle.

$m\angle XYW + m\angle WYZ = m\angle XYZ$

INTERIOR DESIGN **Wall stickers of standard shapes are often used to provide a stimulating environment for a young child's room. A five-pointed star sticker is shown with vertices labeled. Find $m\angle GBH$ and $m\angle HCI$ if $\angle GBH \cong \angle HCI$, $m\angle GBH = 2x + 5$, and $m\angle HCI = 3x - 10$.**



$2x+5 = 3x-10$

$15 = x$

$2(15)+5 = 35^{\circ}$

Step 1 Solve for x.

$\angle GBH \cong \angle HCI$	Given
$m\angle GBH = m\angle HCI$	Definition of congruent angles
$2x + 5 = 3x - 10$	Substitution
$2x + 15 = 3x$	Add 10 to each side.
$15 = x$	Subtract $2x$ from each side.

Example

ALGEBRA In the figure, $\overrightarrow{KJ}$ and $\overrightarrow{KM}$ are opposite rays, and $\overrightarrow{KN}$ bisects $\angle JKL$. If $m\angle JKN = 8x - 13$ and $m\angle NKL = 6x + 11$, find $m\angle JKN$.

$6x+11 = 8x-13$

$6x+24 = 8x$

$24 = 2x$

$12 = x$

$6(12)+11$

$72+11$

$6x+11$

$8x-13$

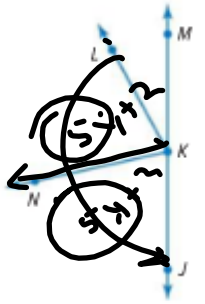
180°

$8(12)-13$

$96-13 = 83^\circ$

Example

Suppose $m\angle JKL = 9y + 15$ and $m\angle JKN = 5y + 2$. Find $m\angle JKL$.



$9y+15 = 5y+2+5y+2$

$9y+15 = 10y+4$

$-4 \quad -4$

$9y+11 = 10y$

$11 = y$

$9(11)+15 = 114^\circ$

$5(11)+2 = 57 \times 2$

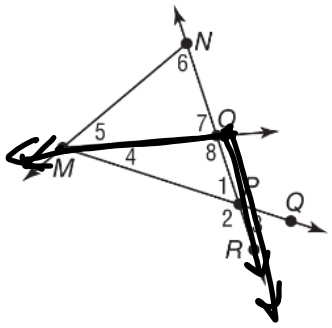
114

Quiz Sec 1.1 to 1.4

NAME _____ DATE _____ PERIOD _____

1-4 Practice
Angle Measure

For Exercises 1-10, use the figure at the right.



Name the vertex of each angle.

1. ∠5 **2.** ∠3

3. ∠8 **4.** ∠*NMP*

Name the sides of each angle.

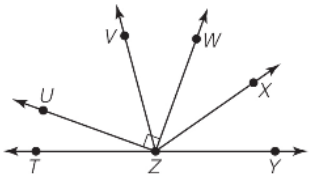
5. ∠6 **6.** ∠2

7. ∠*MOP* $\overrightarrow{OP}$ $\overrightarrow{OM}$ **8.** ∠*OMN* $\overleftrightarrow{}$ $\overrightarrow{MO}$, $\overrightarrow{MN}$

Write another name for each angle.

9. ∠*QPR* **10.** ∠1

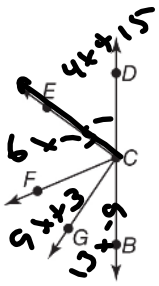
Classify each angle as *right*, *acute*, or *obtuse*. Then use a protractor to measure the angle to the nearest degree.



11. ∠*UZW* **12.** ∠*YZW*

13. ∠*TZW* **14.** ∠*UZT*

ALGEBRA In the figure, $\overrightarrow{CB}$ and $\overrightarrow{CD}$ are opposite rays, $\overrightarrow{CE}$ bisects ∠*DCF*, and $\overleftrightarrow{CG}$ bisects ∠*FCB*.



15. If $m\angle DCE = 4x + 15$ and $m\angle ECF = 6x - 5$, find $m\angle DCE$.

16. If $m\angle FCG = 9x + 3$ and $m\angle GCB = 13x - 9$, find $m\angle GCB$.

15. $4x+5 = 6x-5$
$10 = 2x$
$10 = x$
$4(10)+15 = 55^\circ$

16 $9x+3 = 13x-9$
$12 = 4x$
$3 = x$
$13(3)-9 = 30^\circ$