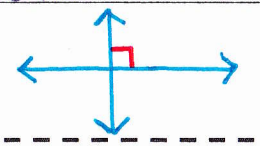
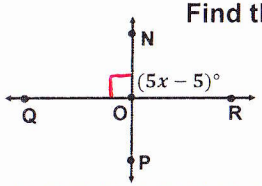
1.6 – SPECIAL ANGLE PAIRS

Objective: I can use the properties of the special ∡ pairs to solve problems.

PERPENDICULAR LINES:
Lines that intersect to form right ∡s

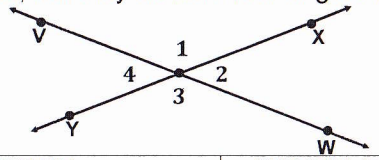


EXAMPLE 1: $\overleftrightarrow{NP}$ and $\overleftrightarrow{QR}$ are perpendicular lines intersecting at O. Find the value of 'x'.



$5x-5=90$
$5x=95$
$x=19$

Not all intersecting lines form right angles, but they do form four angles that have special relationships.

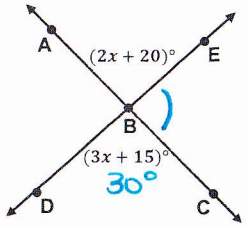


NAME	DESCRIPTION	EXAMPLES
Adjacent Angles	2 ∡s with a common vertex & a common side but no common interior points	∡1 & ∡2 ∡2 & ∡3 ∡3 & ∡4 ∡4 & ∡1
Vertical Angles	• 2 nonadjacent ∡s formed by 2 intersecting lines • Always ≅	∡1 & ∡3 ∡2 & ∡4
Linear Pair	• A pair of adjacent ∡s whose non-common sides are opposite rays • Always add to 180°	∡1 & ∡2 ∡2 & ∡3 ∡3 & ∡4 ∡4 & ∡1

VERTICAL ANGLES are always ***congruent***.

The sum of the measures of the angles in a ***LINEAR PAIR*** is $180°$.

EXAMPLE 2: $\overleftrightarrow{AC}$ and $\overleftrightarrow{DE}$ intersect at B. Find the value of 'x' and the measure of $< EBC$.



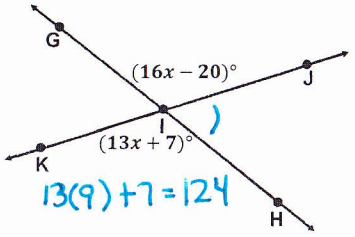
3(5)+15 = 30

* Vertical ∡s are ≅ !

$2x+20=3x+15$
$5=x$

m∡EBC = 180 − 30 = 150°

EXAMPLE 3: $\overleftrightarrow{GH}$ and $\overleftrightarrow{JK}$ intersect at I. Find the value of 'x' and the measure of $< JIH$.



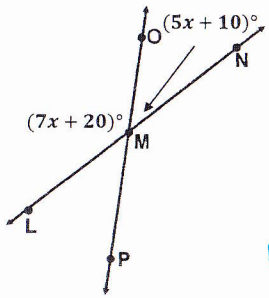
13(9)+7 = 124

* Vertical ∡s are ≅ !

$16x-20=13x+7$
$3x=27$
$x=9$

m∡JIH = 180 − 124 = 56°

EXAMPLE 4: $\overleftrightarrow{LN}$ and $\overleftrightarrow{OP}$ intersect at M. Find the value of 'x' and the measures of $< LMO$ and $< OMN$.



* Linear Pair adds to 180°

$7x+20+5x+10=180$

$12x+30=180$

$12x=150$

$x=\frac{25}{2}=12.5$

$m\angle LMO=7(12.5)+20=107.5°$

$m\angle OMN=5(12.5)+10=72.5°$

The ***sum*** of the measures of $< LMO$ and $< OMN$ in EXAMPLE 4 is $\mathbf{180°}$. Two angles whose measures have a sum of $180°$ are called ***supplementary angles***.

Similarly, when the ***sum*** of the measures of two angles is $\mathbf{90°}$, the angles are called ***complementary angles***.

EXAMPLE 5: If < 1 and < 2 are complements, with $m < 1 = (2x + 20)°$ and $m < 2 = (3x + 15)°$, find the value of 'x'.

*Complements add to 90°

$2x+20+3x+15=90$

$5x+35=90$

$5x=55$

$x=11$

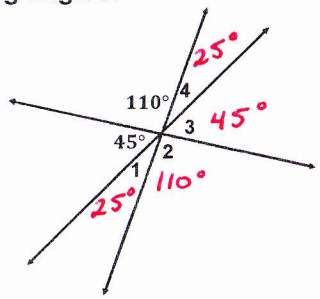
EXAMPLE 6: Find all of the missing angles.

$m < 1 =$ 25°

$m < 2 =$ 110°

$m < 3 =$ 45°

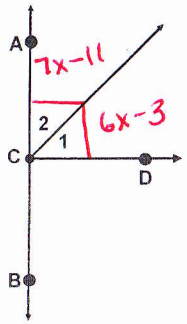
$m < 4 =$ 25°



$m\angle 4=180-(110-45)=25°$

$\angle 1 \cong \angle 4$ are vertical $\angle$s.

EXAMPLE 7: $\overrightarrow{CD} \perp \overrightarrow{AB}$, $m < 1 = (6x - 3)°$, $m < 2 = (7x - 11)°$. Find the value of 'x'.



$6x-3+7x-11=90$

$13x-14=90$

$13x=104$

$x=8$