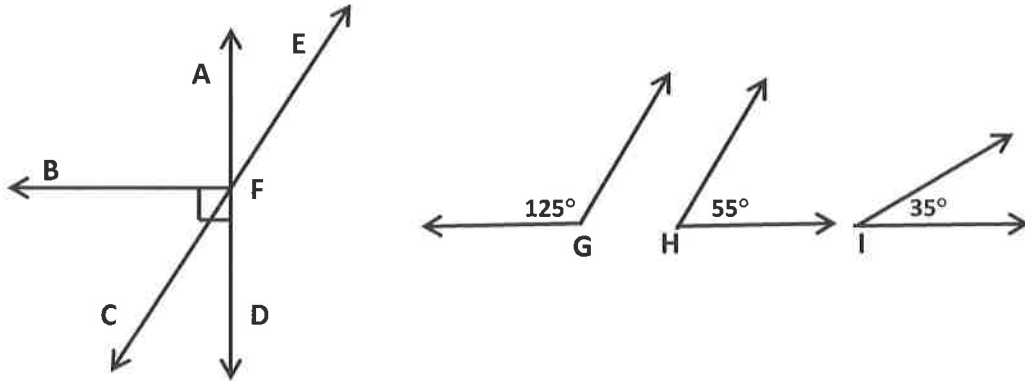


Vocabulary

For each term state the definition, sketch a diagram, and provide examples from the following diagrams.



Definition	Diagram	Example
Complementary angles two angles that add up to 90°		
Supplementary angles two angles that add up to 180°		
Adjacent angles two angles next to each other that share a common vertex and a common side		<p>$\angle ABC$ and $\angle CBD$</p> <ul style="list-style-type: none"> - share vertex B - share side \vec{BC}
Linear pair two adjacent angles that form a line together		<p>$\angle DEF$ and $\angle FEG$</p> <p>$m\angle DEF + m\angle FEG = 180^\circ$</p>
Vertical angles two angles across from each other when two lines cross to form an X		<p>$\angle 1$ and $\angle 3$</p> <p>$\angle 2$ and $\angle 4$</p>

Using Angle Pairs

Example 1: If $m\angle 4 = 168^\circ$, find $m\angle 3$, $m\angle 5$, and $m\angle 6$.

$m\angle 3 + m\angle 4 = 180^\circ$ (linear pair)

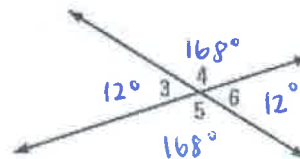
$m\angle 4 + m\angle 6 = 180^\circ$ (linear pair)

$m\angle 3 + 168 = 180$

$168 + m\angle 6 = 180$

$m\angle 3 = 12^\circ$

$m\angle 6 = 12^\circ$



(linear pair)

$m\angle 5 + m\angle 6 = 180$

$m\angle 5 + 12 = 180$

$m\angle 5 = 168^\circ$

Example 2 : $\angle A$ and $\angle B$ are complementary. Find $m\angle A$ and $m\angle B$. ↗ add to 90°

$$m\angle A = (11x + 24)^\circ$$

$$m\angle B = (x + 18)^\circ$$

$$m\angle A + m\angle B = 90$$

$$11x + 24 + x + 18 = 90$$

$$12x + 42 = 90$$

$$12x = 48$$

$$x = 4$$

$$m\angle A = 11(4) + 24$$

$$m\angle A = 68^\circ$$

$$m\angle B = 4 + 18$$

$$m\angle B = 22^\circ$$

Check: These two should add to 90
 $68 + 22 = 90$ ✓

Example 3 : Find $m\angle DEG$ and $m\angle GEF$.

$$m\angle HED + m\angle DEG + m\angle GEF = 180$$

$$90 + 6x + 4x = 180$$

$$90 + 10x = 180$$

$$10x = 90$$

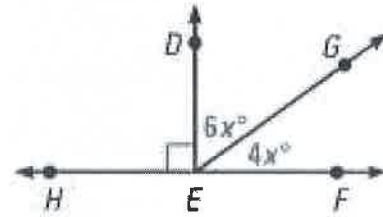
$$x = 9$$

$$m\angle DEG = 6(9)$$

$$m\angle DEG = 54^\circ$$

$$m\angle GEF = 4(9)$$

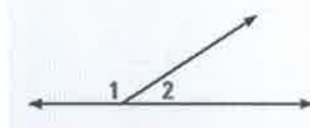
$$m\angle GEF = 36^\circ$$



$\angle HEF$ is a straight angle (180°)

Linear Pair Postulate (LPP)

If two angles form a linear pair, then they are supplementary.



$$m\angle 1 + m\angle 2 = 180^\circ$$

Example 4: Solve for x in the diagram then find $m\angle PSQ$.

$$m\angle OSP + m\angle PSQ = 180$$

$$42 + 3x + 6 = 180$$

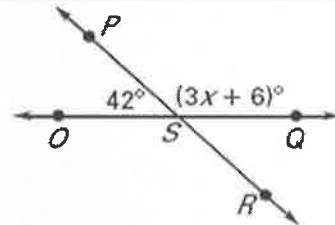
$$3x + 48 = 180$$

$$3x = 132$$

$$x = 44$$

$$m\angle PSQ = 3(44) + 6$$

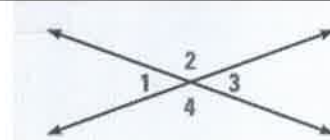
$$m\angle PSQ = 138^\circ$$



$\angle OSQ$ is a straight angle (180°)

Vertical Angles Theorem (VAT)

Vertical angles are congruent.



$$\angle 1 \cong \angle 3 \text{ and } \angle 2 \cong \angle 4$$

Example 5: Find the value of y and the measure of each angle in the diagram below.

$$4y - 42 = 2y$$

$$-42 = -2y$$

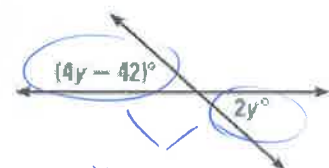
$$y = 21$$

$$\text{first angle} = 4(21) - 42$$

$$= 42^\circ$$

$$\text{second angle} = 2(21)$$

$$= 42^\circ$$



Vertical angles are equal

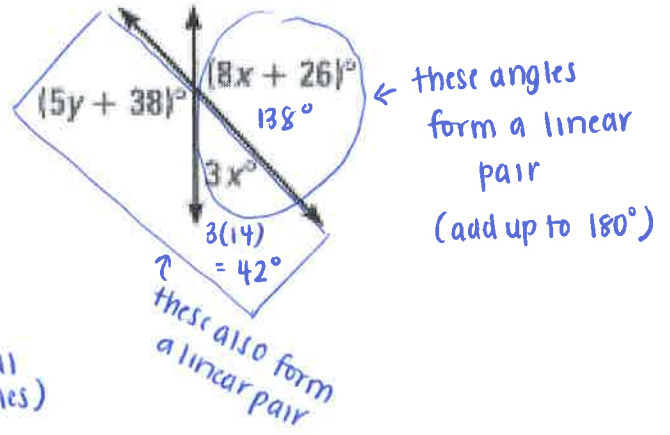
Example 6 : Find the values of x and y.

$$8x + 26 + 3x = 180 \text{ (Linear Pair)}$$

$$11x + 26 = 180$$

$$11x = 154$$

$$\boxed{x = 14}$$



$$5y + 38 + 42 = 180 \text{ (Linear Pair)}$$

$$5y + 80 = 180$$

$$5y = 100$$

$$\boxed{y = 20}$$

$$5y + 38 = 138 \text{ (vertical angles)}$$

$$5y = 100$$

$$\boxed{y = 20}$$

Example 7 : Find the measure of each angle in the diagram.

$$2(5x - 5) = 6x + 50 \text{ (vertical angles)}$$

$$10x - 10 = 6x + 50$$

$$4x - 10 = 50$$

$$4x = 60$$

$$\boxed{x = 15}$$

$$5y + 5 = 7y - 9 \text{ (vertical angles)}$$

$$5 = 2y - 9$$

$$14 = 2y$$

$$\boxed{y = 7}$$

