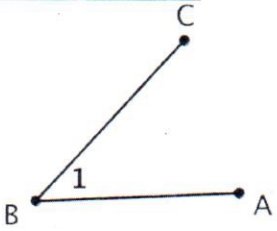
Objective:

- Students will know how to use and be able to prove the vertical angle theorem.

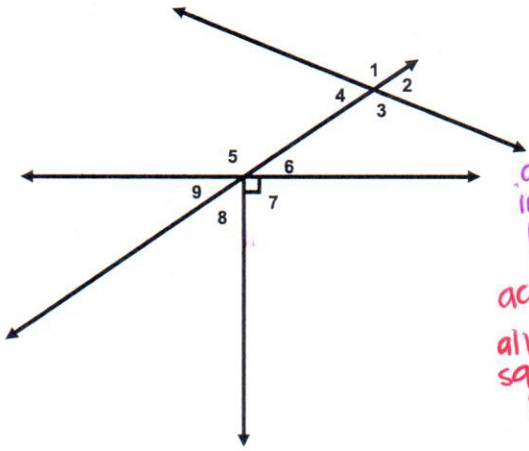
Naming an Angle:



How many different ways can you name this angle?

∠ABC
∠CBA
∠B
∠1

Different Kinds of Angles:



2 angles in a line across always same size

next to

Adjacent Angles: 2 angles that share a common side and a common vertex
Examples:
∠1 & ∠2 ∠3 & ∠4 ∠9 & ∠8 ∠4 & ∠1

Linear Pairs: 2 angles that are adjacent and supplementary
Examples:
∠1 and ∠2 ∠4 & ∠3 ∠5 & ∠6 ∠9 and ∠5

Vertical Angles: 2 nonadjacent angles formed by 2 intersecting lines
Examples:
∠1 and ∠3 ∠9 & ∠6 ∠4 & ∠2

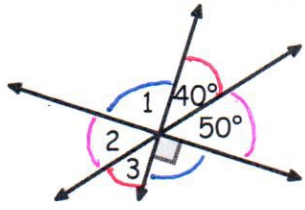
Supplementary Angles:
2 angles whose sum is 180°.
Examples:
∠1 & ∠2 ∠5 & ∠6 ∠4 & ∠3 ∠2 & ∠3

Right Angles:
angles equal to 90°.
Examples:
∠7

Complementary Angles:
2 angles whose sum is 90°.
Examples:
∠9 & ∠8

Practice Set:

1) What are the measures of ∠1, ∠2, ∠3?



∠1 = 90°
∠2 = 50°
∠3 = 40°

2) If $m\angle B = 37°$, find the measure of it's complement.

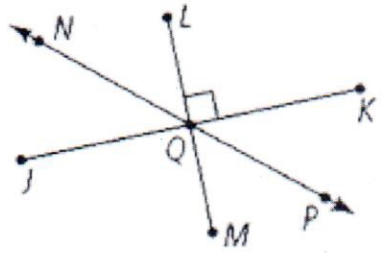
90 − 37 = 53°

3) If $m\angle B = 87°$, find the measure of it's supplement.

180°

180° − 87° = 93°

4)



a) Name an angle adjacent to $\angle KQP$
∠KQL OR ∠PQM

b) Name an angle supplementary to $\angle PQJ$
∠KQP OR ∠JQN

c) Name an angle complementary to $\angle LQN$
∠NQJ

d) List a pair of vertical angles.
∠NQJ and ∠KQP OR ∠KQL and ∠JQM

e) Name two angles that form a linear pair.
∠KQL and ∠LQJ

5) $\angle A$ and $\angle B$ are complementary. Find $m\angle A$ and $m\angle B$ if $m\angle A = 3x - 5$ and $m\angle B = x + 15$.

$\angle A + \angle B = 90°$

$3x - 5 + x + 15 = 90°$

$4x + 10 = 90°$

$-10 \quad -10$

$\frac{4x}{4} = \frac{80}{4}$

$x = 20°$

$m\angle A = 3(20) - 5$

$m\angle A = 55°$

$m\angle B = 20 + 15$

$m\angle B = 35°$

6) $\angle A$ and $\angle B$ are supplementary. Find $m\angle A$ and $m\angle B$ if $m\angle A = 2x + 5$ and $m\angle B = 3x - 10$.

$\angle A + \angle B = 180°$

$2x + 5 + 3x - 10 = 180$

$5x - 5 = 180$

$+5 \quad +5$

$\frac{5x}{5} = \frac{185}{5}$

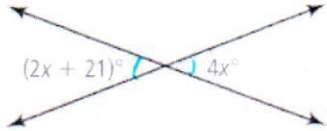
$x = 37$

$m\angle A = 2(37) + 5$

$m\angle A = 79°$

$m\angle B = 101°$

7) Write an equation and solve for x.



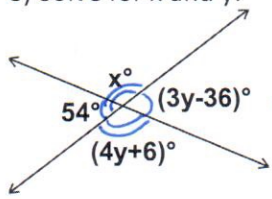
$2x + 21 = 4x$

$-2x \quad -2x$

$\frac{21}{2} = \frac{2x}{2}$

$x = \frac{21}{2}$

8) Solve for x and y.



$54 = 3y - 36$

$+36 \quad +36$

$\frac{90}{3} = \frac{3y}{3}$

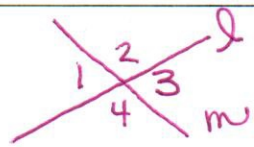
$y = 30$

$x = 4y + 6$

$x = 4(30) + 6$

$x = 126$

9) Given: Lines l and m intersect to form vertical angles ∠1 and ∠3.
Prove: Vertical Angles Theorem: $m\angle 1 \cong m\angle 3$



Statement	Reason
1) Lines l and m intersect to form vertical angles ∠1 and ∠3	1) Given
2) ∠1 and ∠2 are supplementary ∠3 and ∠2 are supplementary	2) Linear pairs
3) $m\angle 1 + m\angle 2 = 180°$ $m\angle 3 + m\angle 2 = 180°$	3) supplementary angles
4) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$ $-m\angle 2 \quad -m\angle 2$	4) substitution prop.
5) $m\angle 1 \cong m\angle 3$	5) subtraction prop.