Accelerated Math Notes
Line and Angle Relationships
(Section 11-1)

A •————• B **Ray** $\overrightarrow{AB}$

C •————• D **Segment** $\overline{CD}$

E • — F • **Line** $\overleftrightarrow{EF}$

How do we define an angle? Two rays with a common vertex

How do we name angles?

∠ABC
∠CBA
∠B
∠1

∠FEG
∠GEF
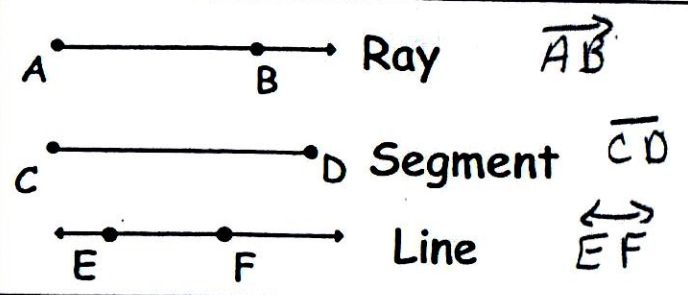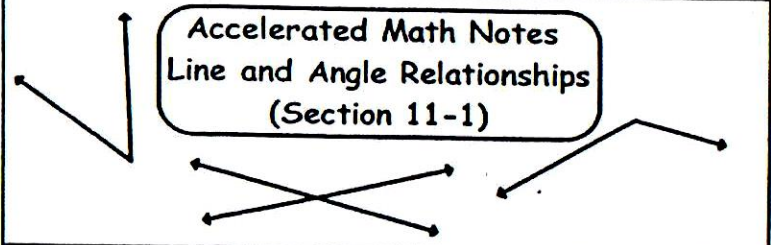
How do we classify angles?

Acute angles $< 90°$

Obtuse angles $> 90°$ and $< 180°$

Right angles $90°$

Straight angles $180°$

Reflex angles   more than $180°$
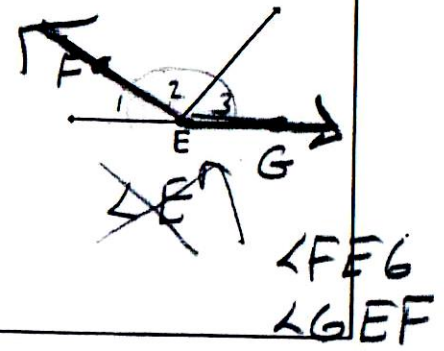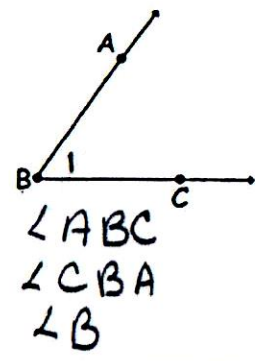
Complementary angles have a sum of 90°

∠1 and ∠2 are compl.

Supplementary angles have a sum of 180°

$180°$

Find the missing angle measure.

? 52°

$\begin{array}{r} 180 \\ -52 \\ \hline 128° \end{array}$

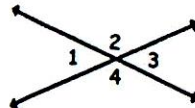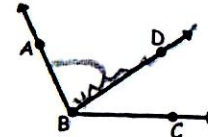These are complementary
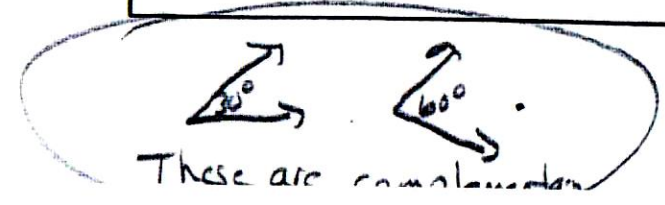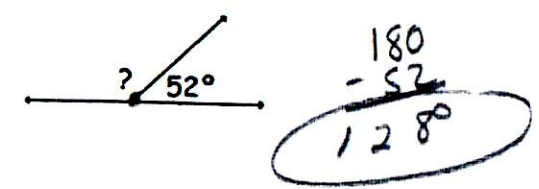
When two lines intersect, they form two pairs of opposite angles, called vertical angles. <u>Vertical angles</u> are congruent.

$$\begin{array}{r} 180 \\ -28 \\ \hline \end{array}$$
P 152°

280°   28°

152°
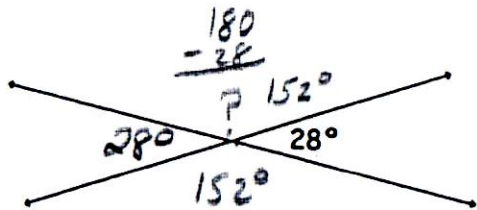
Two angles that have the same vertex between them, share a common side, and do not overlap are called <u>adjacent angles</u>.

∠1 and ∠2
∠2 and ∠3
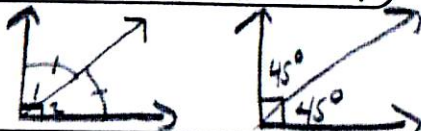∠3 and ∠4
∠4 and ∠1

∠ABD is adjacent to ∠DBC

Sketch a picture of two angles that are adjacent, congruent, and complementary.

45°
45°

One angle is five times as large as another angle. If the angles are complementary, find the measures of both angles algebraically (write an equation and solve).

Let X = 1 angle
5X = other angle   15°
                       5(15) = 75°
(sum = 90°)

X + 5X = 90
6X = 90
$\frac{6X}{6} = \frac{90}{6}$
X = 15

The eight angles formed by parallel lines and a transversal (a lines that intersects two or more parallel lines) have special names. $L_1 // L_2$

∠1

1 2
8 3

7 4
6 5

∠2
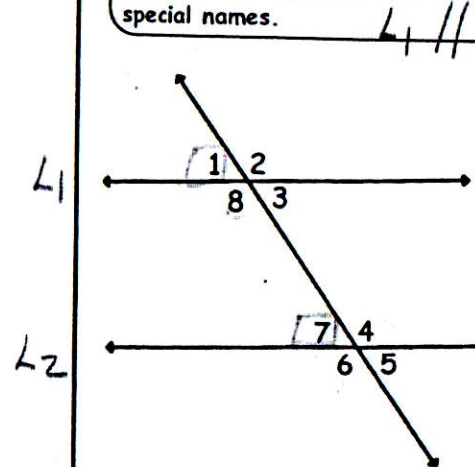
<u>Alternate interior angles</u>
∠8 and ∠4
∠7 and ∠3

<u>Alternate exterior angles</u>
∠2 and ∠6
∠1 and ∠5

<u>Corresponding angles</u>
Same side of transversal have same position.

∠1 and ∠7   ∠2 and ∠4
∠8 and ∠6   ∠3 and ∠5

Box 1 (top left)

> If two parallel lines are cut by a transversal, then
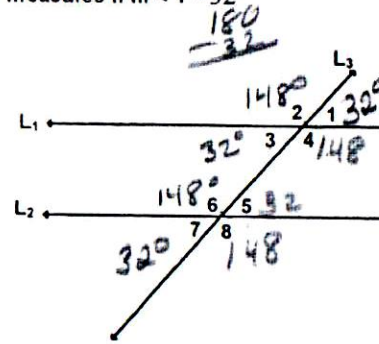> *corresponding angles are congruent
> *alternate interior angles are congruent
> *alternate exterior angles are congruent

Angles are congruent $\angle 1 \cong \angle 2$
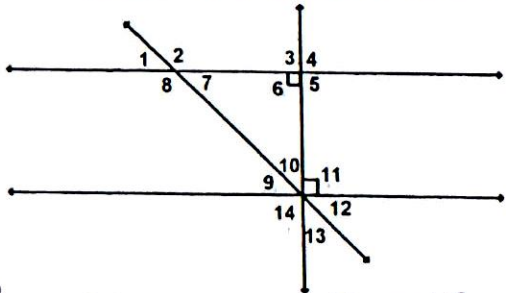
Measures of angles are equal $m\angle 1 = m\angle 2$

measure of $\angle 1$

Box 2 (top right)

Lines L_1 and L_2 are parallel. L_3 is a transversal. Find the missing angle measures if $m\angle 1 = 32°$

$$180 - 32$$

$148°$ — $\angle 2$, $\angle 1$ $32°$
$32°$ — $\angle 3$, $\angle 4$ 148
$148°$ — $\angle 6$, $\angle 5$ 32
$32°$ — $\angle 7$, $\angle 8$ 148

$\angle 1$ and $\angle 7$ alt ext $\angle$'s
$\angle 1$ and $\angle 3$ vertical
$\angle 3$ and $\angle 5$ alt int $\angle$'s
$\angle 1$ and $\angle 2$ supplementa.
$\angle 4$ and $\angle 8$ corresponding
$\angle 6$ and $\angle 4$ are alt int $\angle$'s

Box 3 (bottom left)

What do we know about these angle measures?

$90° = m\angle 11, m\angle 6, m\angle 4, m\angle 3, m\angle 5, m\angle 14$
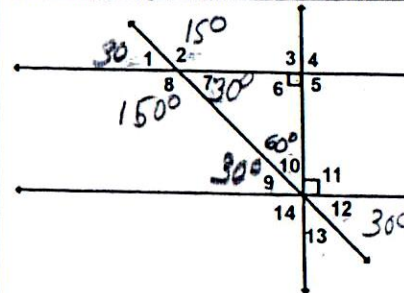
$m\angle 9 + m\angle 10 = 90$ $m\angle 12 + m\angle 13 = 90$

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

$m\angle 7 = m\angle 9$ alt int angles

$m\angle 7 + m\angle 6 + m\angle 10 = 180°$

Box 4 (bottom right)

Find these angle measures if we know that $m\angle 9 = 30°$

$m\angle 9 = 30°$
$m\angle 10 = 60°$
$m\angle 11 = 90°$
$m\angle 12 = 300°$
$m\angle 13 = 60°$
$m\angle 14 = 90°$

$m\angle 1 = 30°$
$m\angle 2 = 150$
$m\angle 3 = 90°$
$m\angle 4 = 90°$
$m\angle 5 = 90°$
$m\angle 6 = 90°$
$m\angle 7 = 30°$
$m\angle 8 = 150°$