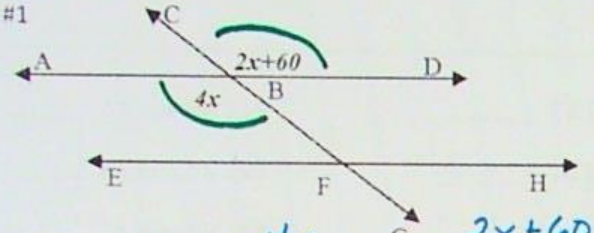
Finding Unknown Angle Measures

We will use the angle relationships that are formed when two parallel lines are intersected by a transversal to find the measures of missing angles. All of the angle relationships will either be supplementary or congruent.

Example A: The pair of angles are either vertical angles, alternate interior angles, alternate exterior angles, or corresponding angles; so they are **congruent**. All you have to do is set up and solve an equation where the expressions are congruent. Once you have solved for x, substitute that value back into each expression to find the measure of each angle.

#1



Relationship: Vertical

Equation: $4x = 2x + 60$

$-2x \quad -2x$

$\frac{2x}{2} = \frac{60}{2}$

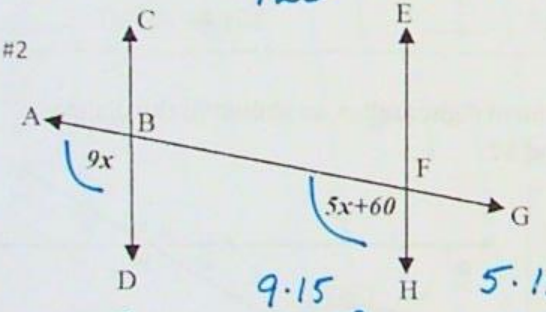
$x = 30$

$x = 30$ $\angle ABG = 120^\circ$ $\angle CBD = 120^\circ$

4x → 4·30 → 120°

2x+60 → 2·30+60 → 120°

#2



Relationship: corresponding

Equation: $9x = 5x + 60$

$-5x \quad -5x$

$\frac{4x}{4} = \frac{60}{4}$

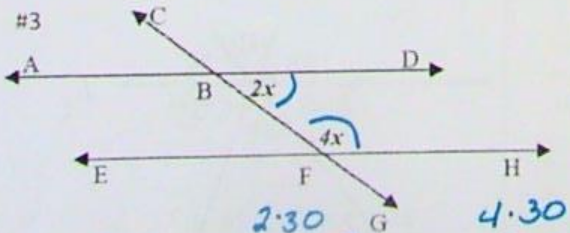
$x = 15$

$x = 15$ $\angle ABD = 135^\circ$ $\angle HFA = 135^\circ$

9·15 5·15+60

Example B: Each pair of angles are **supplementary** to each other, which means the angles add up to 180°. All you have to do is set up and solve an equation where the expressions add up to equal 180°. Once you have solved for x, substitute that value back into each expression to find the measure of each angle.

#3



Relationship: supplementary

Equation: $2x + 4x = 180$

$\frac{6x}{6} = \frac{180}{6}$

$x = 30$

$x = 30$ $\angle FBD = 60^\circ$ $\angle HFB = 120^\circ$

2·30 4·30

$60^\circ + 120^\circ = 180^\circ$