Name: Answer Key Date: _____

Lesson #13- Solving for the Measure of an Angle Algebraically

Essential Question: How can we use the properties of angles to solve for the measure of a missing angle algebraically?

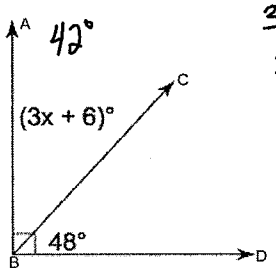
Do Now: Solve the following equations for *x*!

1. $3x+6=48$
   $-6 \quad -6$
   $\frac{3x}{3}=\frac{42}{3}$
   $x=14$

2. $5x+3x=8$
   $\frac{8x}{8}=\frac{8}{8}$
   $x=1$

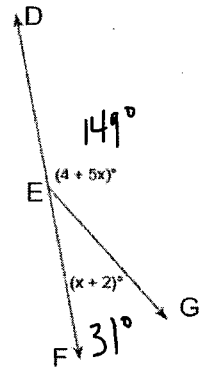
3. $\frac{5x}{-5x}+\frac{12}{3}=\frac{8x}{-5x}-\frac{3}{3}$
   $\frac{15}{3}=\frac{3x}{3}$
   $5=x$

Directions: Find the value of x algebraically. Then, identify the measure of the missing angle(s).

4. 

$3x+6+48=90$
$3x+54=90$
$-54 \quad -54$
$\frac{3x}{3}=\frac{36}{3}$
$x=6$

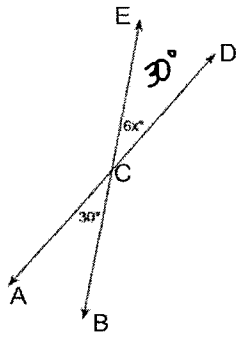
$m\angle ABC=3x+6$
$m\angle ABC=3(12)+6$
$m\angle ABC=36+6$
$m\angle ABC=42°$

5. 

$4+5x+x+2=180$
$6+6x=180$
$-6 \quad -6$
$\frac{6x}{6}=\frac{174}{6}$
$x=29$

$m\angle DEG=4+5x$
$m\angle DEG=4+5(29)$
$m\angle DEG=149°$

$m\angle FEG=x+2$
$m\angle FEG=29+2$
$m\angle FEG=31°$

6. 

$\frac{30}{6}=\frac{6x}{6}$
$5=x$

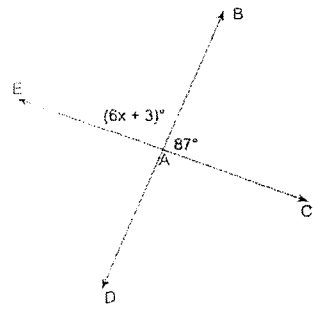
$m\angle ECD=6x$
$m\angle ECD=6(5)$
$m\angle ECD=30°$

Steps for solving for the value of a missing angle algebraically:

1. Identify the angle relation
2. Set up the appropriate equation
3. Solve for X.
4. Substitute the identified value of X in for the angle value and solve

Directions: Using the properties of angles, solve for the value of x. Then, identify the measure of the missing angle(s).

7.



$6x+3+87=180$

$6x+90=180$

$-90 \quad -90$

$\frac{6x}{6}=\frac{90}{6}$

$x=15$

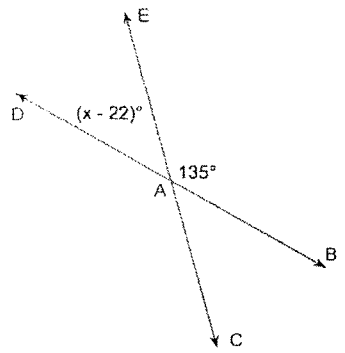
$m\angle EAB=6x+3$

$m\angle EAB=6(15)+3$

$m\angle EAB=93°$

Value of x= 15 m∠EAB= 93°

8.



$x-22+135=180$

$x+113=180$

$-113 \quad -113$

$x=67$

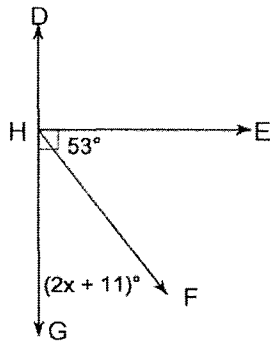
$m\angle DAE=x-22$

$m\angle DAE=67-22$

$m\angle DAE=45°$

Value of x= 67 m∠DAE= 45°

9.



$2x+11+53=90$

$2x+64=90$

$-64 \quad -64$

$\frac{2x}{2} = \frac{26}{2}$

$x=13$

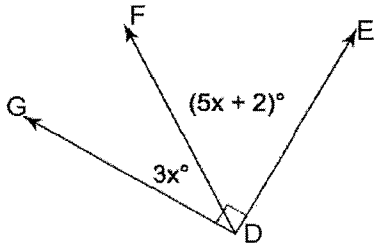
$m\angle FGH = 2x+11$

$m\angle FGH = 2(13)+11$

$m\angle FGH = 37°$

Value of x= 13 m∠FHG= 37°

10.



$3x+5x+2=90$

$8x+2=90$

$-2 \quad -2$

$\frac{8x}{8} = \frac{88}{8}$

$x=11$

$m\angle EDF = 5x+2$

$m\angle EDF = 5(11)+2$

$m\angle EDF = 57°$

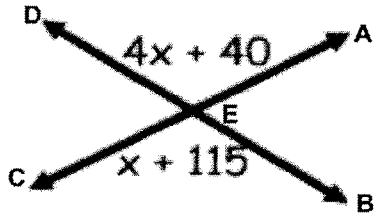
$m\angle FDG = 3x$

$m\angle FDG = 3(11)$

$m\angle FDG = 33°$

Value of x= 11 m∠EDF= 57° m∠FDG= 33°

11.



$4x+40 = x+115$

$-x \quad -40 \quad -x \quad -40$

$\frac{3x}{3} = \frac{75}{3}$

$x=25$

$m\angle DEA = 4x+40$

$m\angle DEA = 4(25)+40$

$m\angle DEA = 140°$

$m\angle CEB = x+115$

$m\angle CEB = 25+115$

$m\angle CEB = 140°$

Value of x= 25 m∠DEA= 140° m∠CEB= 140°