Grab a worksheet from the front table and Warm Up on A - F. Don't work past F.

Classwork - Finding Missing Angle in Triangles

Warm Up: Determine whether (Yes or No) the side lengths and angle measures can be those of a triangle.

SHOW WORK

Side Lengths
A) 8 in, 3 in, 10 in

$8+3 > 10$ (Yes)
$11 > 10$

B) 7 cm, 12 cm, 5 cm

$7+5 > 12$
$12 \not> 12$ (No)

C) 14 ft, 6 ft, 7 ft

$6+7 > 14$
$13 \not> 14$ (No)

Angle Measures
D) 144°, 13°, 23°

$144+13+23 = (180)°$
(Yes)

E) 47°, 29°, 92°

$47+29+92 = 168°$
(No)

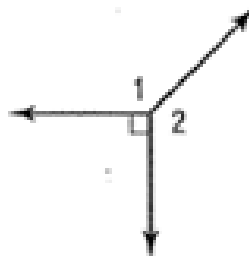F) 75°, 22°, 83°

$75+22+83 = (180)°$
(Yes)

Classify each pair of angles as *complementary, supplementary, or neither.*
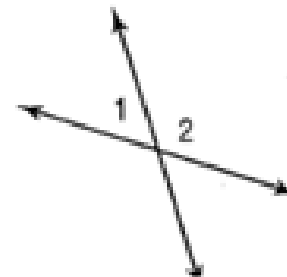
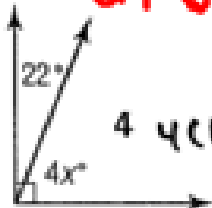1.
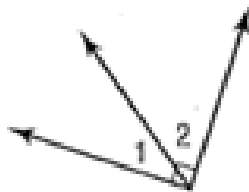
Complementary

2.

Neither

3.

Supplementary

ALGEBRA Write and solve an equation to find the value of *x* in each figure. Then find the measure of the missing angle. SHOW WORK AND LABEL
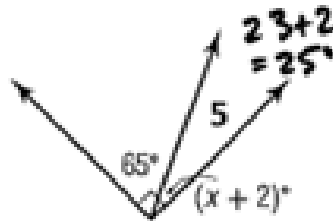
4.

22 + 68 = 90

22°
4 4(17)=
4x°

$4x + 22 = 90$
$-22 \quad -22$
———————
$\dfrac{4x}{4} = \dfrac{68}{4}$
$x = 17$

5.

23+2
=25°
5
65°
$(x + 2)°$

$x + 2 + 65 = 90$
$x + 67 = 90$
$-67 \quad -67$
———————
$x = 23$

6.

54 - 7
= 47°

$(x - 7)°$
43° 6
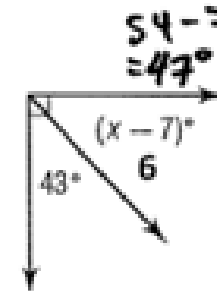
$x - 7 + 43 = 90$
$x + 36 = 90$
$-36 \quad -36$
———————
$x = 54$

$x = \underline{\ 17\ } \quad \angle 4 = \underline{\ 68°\ }$

$x = \underline{\ 23\ } \quad \angle 5 = \underline{\ 25°\ }$

$x = \underline{\ 54\ } \quad \angle 6 = \underline{\ 47°\ }$

7.

$$\frac{156-5}{7} = 151°$$

$(x-5)°$

$29°$

$x - 5 + 29 = 180$

$x + 24 = 180$

$\underline{\quad -24 \quad -24 \quad}$

$x = 156$

$x = \underline{156} \qquad \angle 7 = \underline{151°}$

8.

$110°$

$7x°$ 8

$7(10) = 70$

$7x + 110 = 180$

$\underline{\quad -110 \quad -110 \quad}$

$\dfrac{7x}{7} = \dfrac{70}{7}$

$x = 10$

$x = \underline{10} \qquad \angle 8 = \underline{70°}$

9.

9

$72°$ $(x+4)°$

13

$104 + 4 = 108°$

$x + 4 + 72 = 180$

$x + 76 = 180$

$\underline{\quad -76 \quad -76 \quad}$

$x = 104$

$x = \underline{104} \qquad \angle 9 = \underline{108°}$

$\angle 13 = \underline{72°}$

$151° + 29° = 180°$

10.
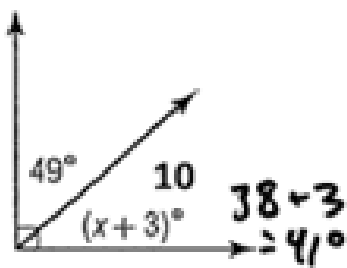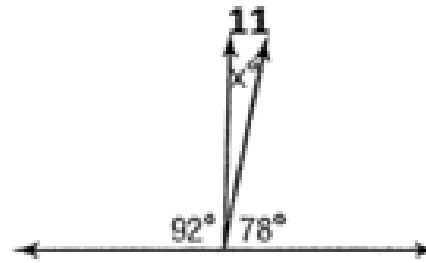
$49°$ 10 $38-3$
$(x+3)°$ $=41°$

$x+3+49=90$

$x+52=90$

$-52 \quad -52$

$x=38$

11.

$92° \quad 78°$

$92+x+78=180$

$x+170=180$

$-170 \quad -170$

$x=10$

12.

$211-50$
$=161°$

$19° \quad 12 \quad (x-50)°$
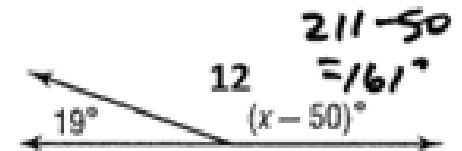
$x-50+19=180$

$x-31=180$

$+31 \quad +31$

$x=211$

$x = \underline{38} \quad \angle 10 = \underline{41°}$ $x = \underline{10} \quad \angle 11 = \underline{10°}$ $x = \underline{211} \quad \angle 12 = \underline{161°}$

13. ALGEBRA If $\angle C$ and $\angle D$ are supplementary, and the measure of $\angle D$ is 45°, what is the measure of $\angle C$?
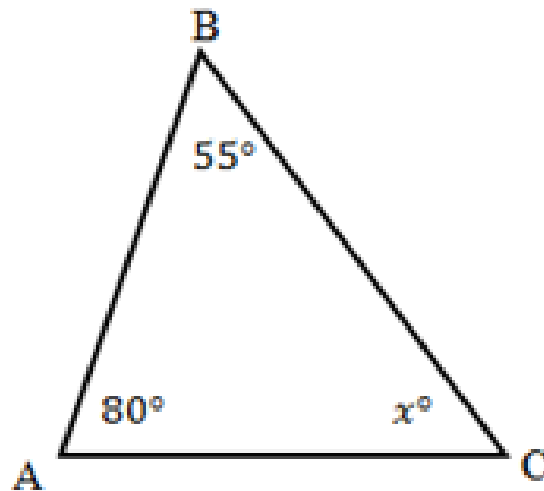
$\angle C + 45° = 180°$

$-45 \quad -45$

$\angle C = 135°$

When finding the whether the angles above in problems D – F, we determined if the 3 angles would form a triangle by checking if the angles added up to __180__ degrees. We can use this information to write equations that solve missing angles.

Equation → $\angle A + \angle B + \angle C = $ __180°__

Insert the degree values that you know and then solve for the missing angle.
SHOW WORK

B

55°

80° $x°$

A   C
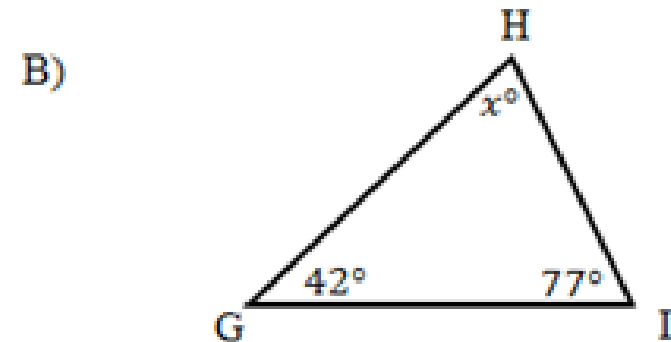
$$80 + 55 + C = 180$$
$$135 + C = 180$$
$$-135 \qquad -135$$
$$\angle C = 45°$$

Practice: Write and then solve an equation to find the missing angles of each of triangles below. **LABEL**

A)

E

$x°$

25°   35°

D ———————————————— F
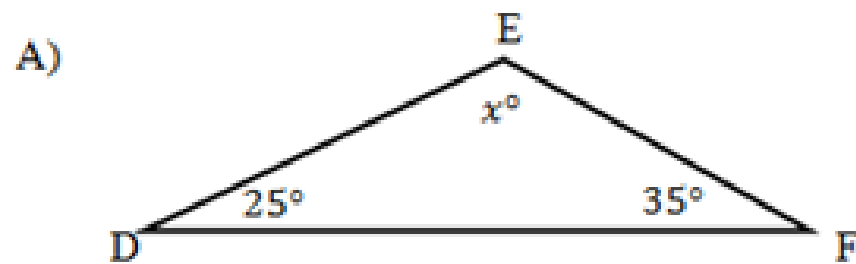
Equation → $25 + x + 35 = 180$

$x + 60 = 180$

Missing Angle = $\underline{120°}$ -60 -60

$x = 120°$

B)

H

$x°$

42°   77°

G   I

Equation → $42 + 77 + x = 180$

$119 + x = 180$

Missing Angle = $\underline{61°}$ -119 -119

$x = 61°$

Writing and Solving Equations to Find the Value of x.

B

$2x°$

$90°$

$x°$

A, C
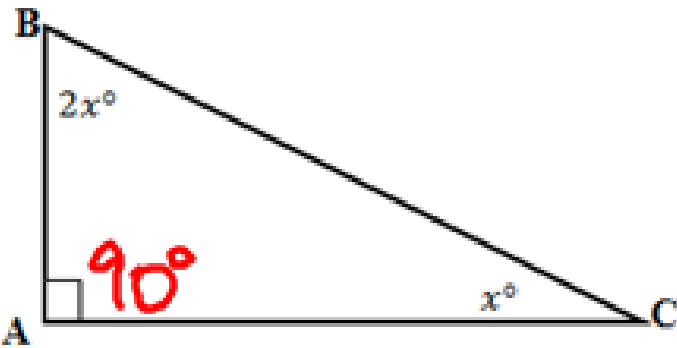
Write an equation to find the value of x.

Equation → $2x + x + 90 = 180$

Solve the equation you wrote above. Remember to solve, **the equation must be completely simplified. SHOW WORK**

Find the missing angles by inserting what you found x to be into the expressions.

$m\angle B = 60°$ $m\angle C = 30°$

$x = 30$

$2(30) = 60°$

$90 + 60 + 30 = 180$ ✓

$2x + x + 90 = 180$

$3x + 90 = 180$

$-90 \quad -90$

$3x = 90$

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

$x = 30$

Practice: Write and solve an equation to find the value of x. Then find the measurement of the missing angle(s).

A)

$70 + 42 + 68 = 180°$

E

$6x°$

$40°$ $26°$ F

D

B)

H

$4x°$

$(2x + 8)°$ $70°$

G   I

Equation →

$6(19)$
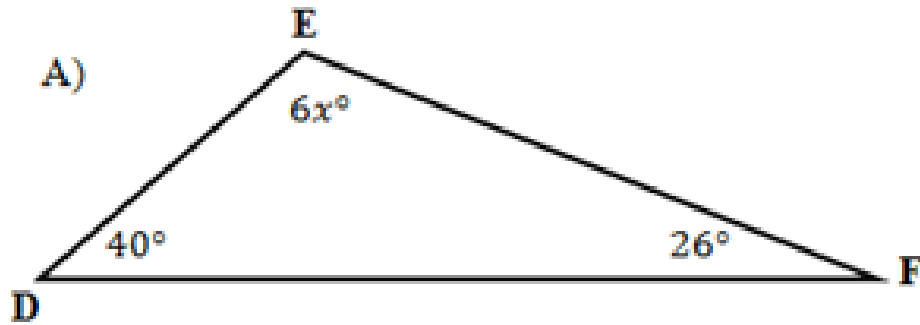
$x = \underline{19}$ $m\angle E = \underline{114°}$

$6x + 40 + 26 = 180$

$6x + 66 = 180$

$ -66 \quad -66$

$\dfrac{6x}{6} = \dfrac{114}{6}$ $\boxed{X = 19}$

Equation →

$2(17) + 8$ $4(17)$
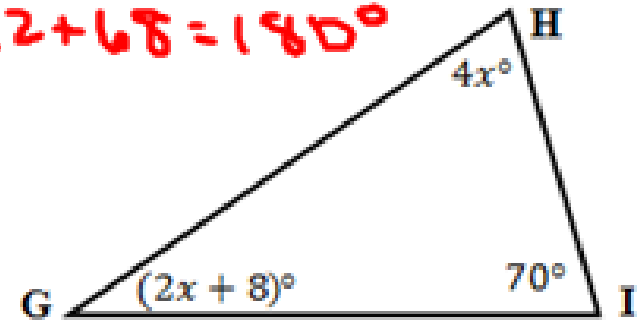
$x = \underline{17}$ $m\angle G = \underline{42°}$ $m\angle H = \underline{68°}$

$2x + 8 + 4x + 70 = 180$

$6x + 78 = 180$

$ -78 \quad -78$

$\dfrac{6x}{6} = \dfrac{102}{6}$

$\boxed{X = 17}$

C)

$3(15) + 2$
$= 47°$

B

$3x + 2°$

A $33°$

$7(15) - 5 = 100°$

$7x - 5°$

C
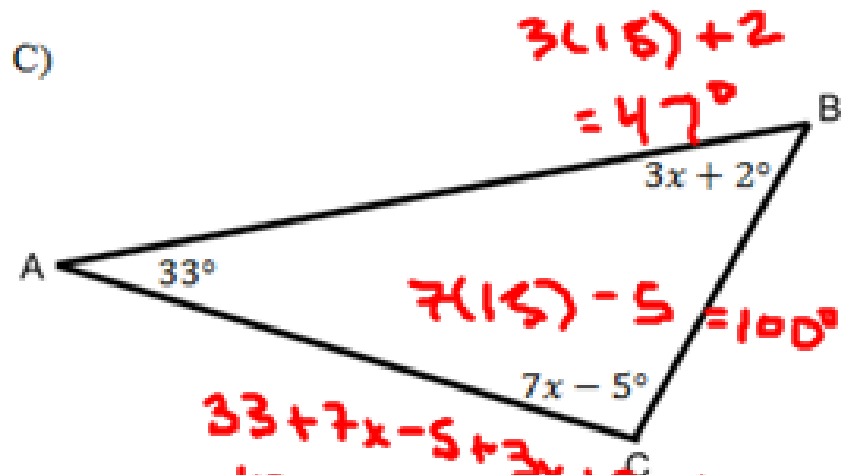
$33 + 7x - 5 + 3x + 2 = 180$

Equation → $10x + 30 = 180$

$\; -30 \quad -30$

$\dfrac{10x}{10} = \dfrac{150}{10}$

$x = \underline{15}$ $m\angle B = \underline{47°}$ $x = 15$

$m\angle C = \underline{100°}$

D) Find the value of x and a.

M

J

$5a°$

$6x + 9°$

L $80°$

80

$65°$

$25°$

K

$6x + 9 + 80 + 25 = 180$
$6x + 114 = 180$
$\; -114 \quad -114$
$\dfrac{6x}{6} = \dfrac{66}{6}$ $x = 11$

N
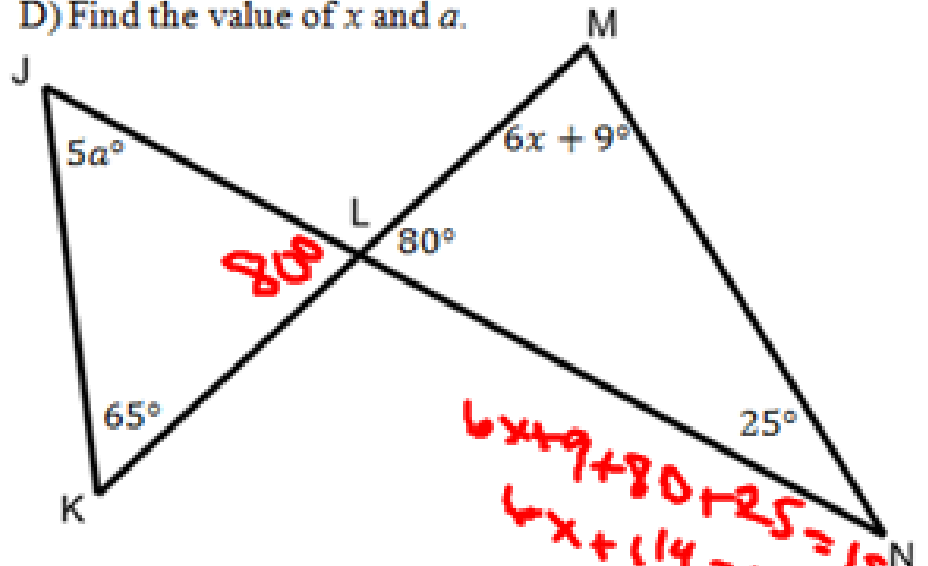
$x = \underline{11}$ $a = \underline{7}$ $m\angle M = \underline{75°}$

$m\angle J = \underline{35°}$ $m\angle KLJ = \underline{80°}$

$5a + 80 + 65 = 180$
$5a + 145 = 180$
$5a = 35$
$a = 7$