Get out your homework and have it ready to check. Quiz on Monday!

Classwork - Angles of Polygons Practice

Polygons and Angles

Find the sum of the interior angle measures of each polygon. SHOW WORK AND LABEL

1. pentagon

$(5-2) \cdot 180$

Angle Sum = $540°$

2. decagon

$(10-2) \cdot 180$

Angle Sum = $1440°$

3. 16-gon

$(16-2) \cdot 180$

Angle Sum = $2520°$

Find the measure of one interior angle and one exterior in each regular polygon. Round to the nearest tenth if necessary.

4. pentagon

A) $\frac{540}{5} = 108°$

B) $\frac{360°}{5} = 72°$

A) Interior = $108°$

B) Exterior = $72°$

5. octagon

A) $\frac{1080}{8}$

B) $\frac{360}{8}$

A) Interior = $135°$

B) Exterior = $45°$

6. 24-gon

A) $\frac{3960}{24}$

B) $\frac{360}{24}$

A) Interior = $165°$

B) Exterior = $15°$

ALGEBRA For Exercises 7 - 9, determine the angle measures in each polygon.

7.

Parallelogram with angles $5x°$, $x°$, $5x°$, $x°$, vertices labeled 1 and 2.
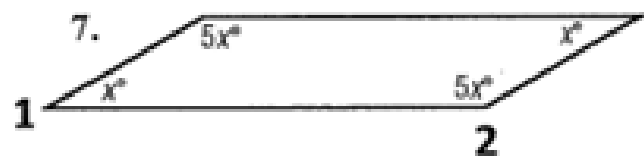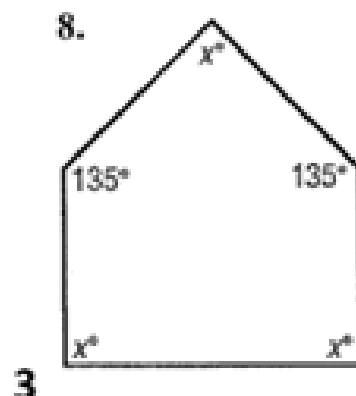
$$5x + x + 5x + x = 360$$

$$\frac{12x}{12} = \frac{360}{12}$$

$$x = 30$$
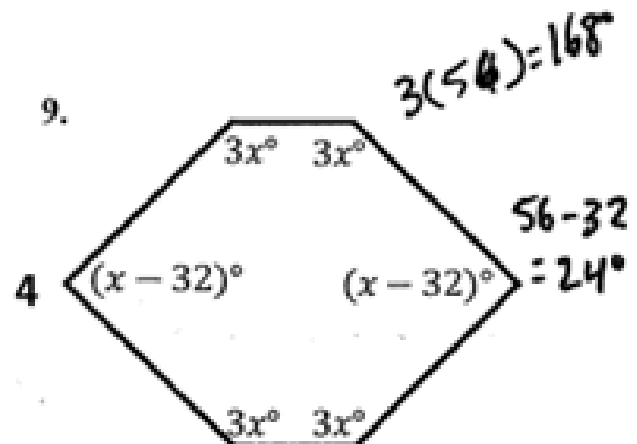
$x = \underline{30}$ $\angle 1 = \underline{30}°$

$5(30)$ $\angle 2 = \underline{150}°$

8.

Pentagon (house shape) with angles $x°$ (top), $135°$, $135°$, $x°$, $x°$, vertex labeled 3.

$$x + 135 + x + 135 + x = 540$$

$$3x + 270 = 540$$

$$-270 \quad -270$$

$$\frac{3x}{3} = \frac{270}{3}$$

$x = \underline{90}$ $\angle 3 = \underline{90}°$

9.

$3(56) = 168°$

Hexagon with angles $3x°$, $3x°$, $(x-32)°$, $(x-32)°$, $3x°$, $3x°$, vertices labeled 4 and 5.

$56 - 32 = 24°$

$$3x + 3x + x - 32 + 3x + 3x + x - 32 = 720$$

$$14x - 64 = 720$$

$$+64 \quad +64$$

$$\frac{14x}{14} = \frac{784}{14} \quad x = 56$$

$x = \underline{56}$ $\angle 4 = \underline{24}°$

$\angle 5 = \underline{168}°$

10. FLOORING A floor is tiled with a pattern consisting of regular octagons and squares as shown. Find the measure of each angle at the circled vertex. Then find the sum of the angles.
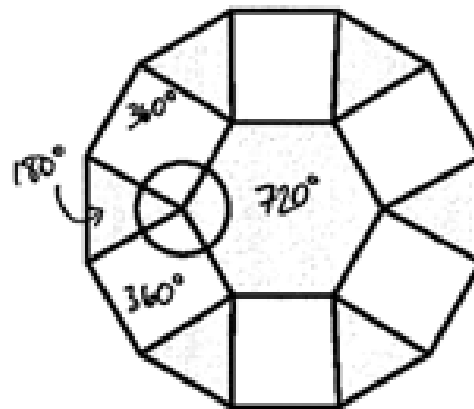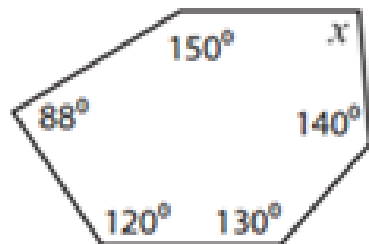

135°

360°
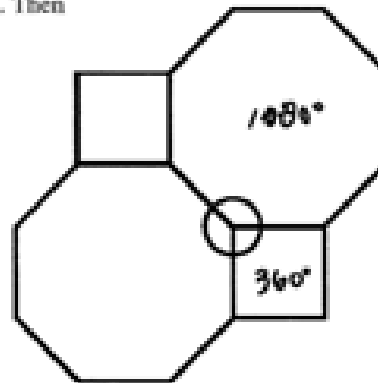
Interior Angle of Square = $90°$

Interior Angle of Octagon = $135°$

Interior Angle of Octagon = $135°$

Sum of the Angles = $360°$ = $135° + 135° + 90°$

11. ART Rachel is laying out a pattern for a stained glass window. So far he has placed the 13 regular polygons shown. Find the measure of each angle at the circled vertex. Then find the sum of the angles.

360°

180°

720°

360°

Hexagon = $120°$

Interior Angle of Square = $90°$

Interior Angle of Triangle = $60°$

Interior Angle of Square = $90°$

Sum of the ~~Hexagon~~ Angles = $360°$ = $120° + 90° + 60° + 90°$

1) Find the missing angle of each polygon. Use the example below to help. SHOW WORK AND LABEL

Example:

Sum of the interior angles = (Number of sides - 2) x 180°

$= (6 - 2) \times 180°$

$= 4 \times 180 = \textbf{720°}$

150° x

88°   140°   Sum of the interior angles = $120° + 140° + 130° + 150° + 88° + x$

$\textbf{720°} = 628° + x$

120°   130°

$x = \textbf{720°} - 628° = \textbf{92°}$

A)

118°

105°

75°

x 130°
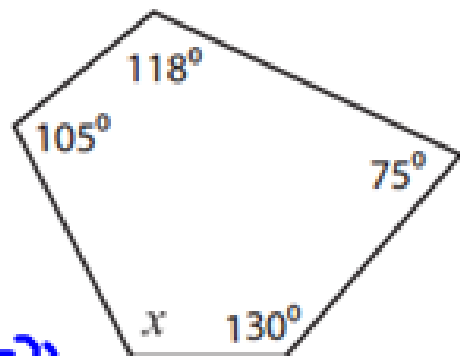
$(5-2) \cdot 180 = 540$

$x + 105 + 118 + 75 + 130 = 540$

$x + 428 = 540$

$-428 \quad -428 \quad x = 112$
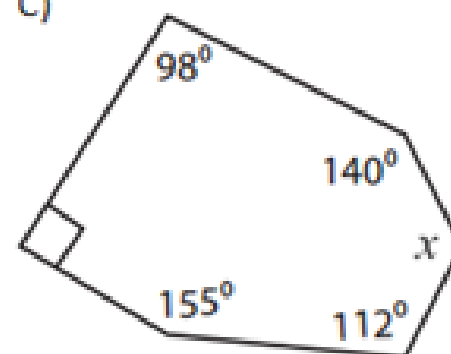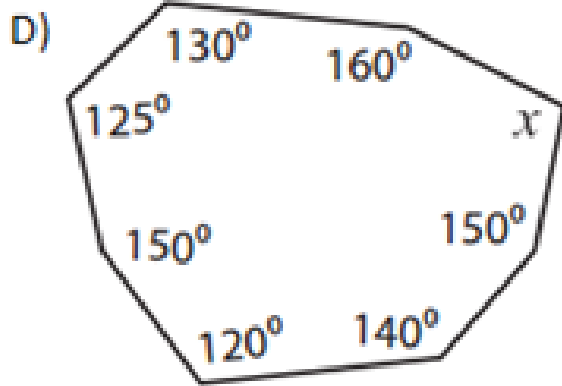
Angle Sum = **540°**

Missing Angle = **112°**

B)
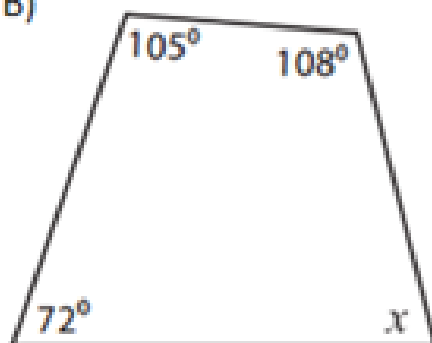
105°   108°

72° x

Angle Sum = _____

Missing Angle = _____

C)

98°

140°

x

155°   112°

Angle Sum = _____

Missing Angle = _____

D)

130° 160°
125°   x
150°   150°
120° 140°

Angle Sum = _____

Missing Angle = _____

E)

115°
x
95°
130°
115°

Angle Sum = _____

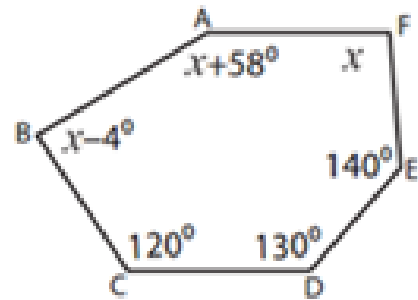Missing Angle = _____

F)

70°
125°
60°   x
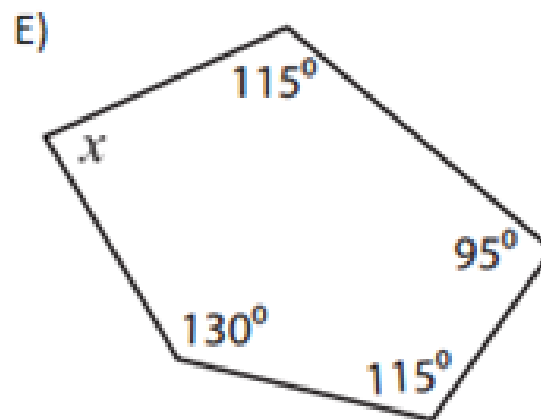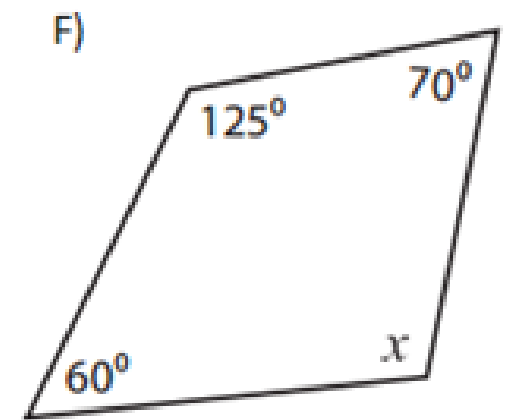
Angle Sum = _____

Missing Angle = _____

2) Create and solve an equation to find the value of x and measurement of the missing angles. SHOW WORK

Example:

Sum of the interior angles = (Number of sides – 2) x 180°

$= (6 - 2) \times 180°$

$= 4 \times 180 = \mathbf{720°}$

Sum of the interior angles $= 120° + 140° + 130° + x+58° + x - 4° + x$

$\mathbf{720°} = 444° + 3x$

$3x = \mathbf{720°} - 444° = 276°$

$x = \frac{276°}{3} = \mathbf{92°}$

$\angle A = x + 58° = \mathbf{92°} + 58° = \mathbf{150°}$

$\angle B = x - 4° = \mathbf{92°} - 4° = \mathbf{88°}$

$\angle F = x = \mathbf{92°}$

A)

B)

C)
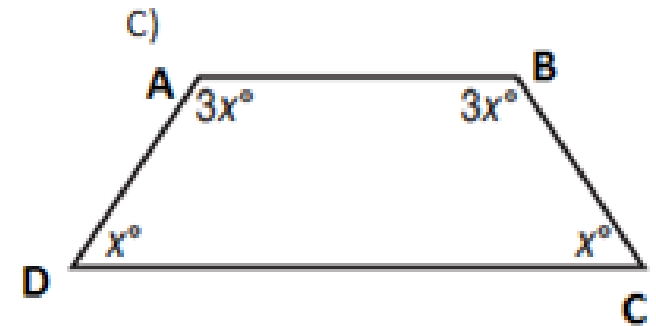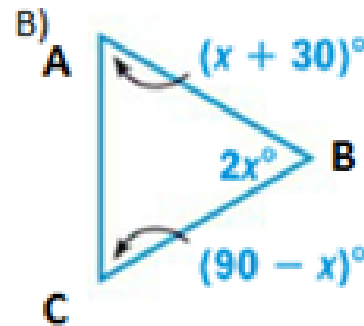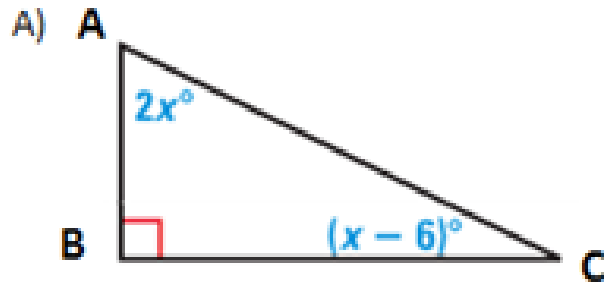
Angle Sum = **180** x = _____

∠A = _____ ∠C = _____

Angle Sum = _____ x = _____

∠A = _____ ∠B = _____

∠C = _____

Angle Sum = _____ x = _____

∠A = _____ ∠B = _____

∠C = _____ ∠D = _____

C) ∠A=80+40

Pentagon with vertices A, B, E, D, C:
- A: x+40°
- B: 80°
- E: 125°
- x+50°
- x+5°
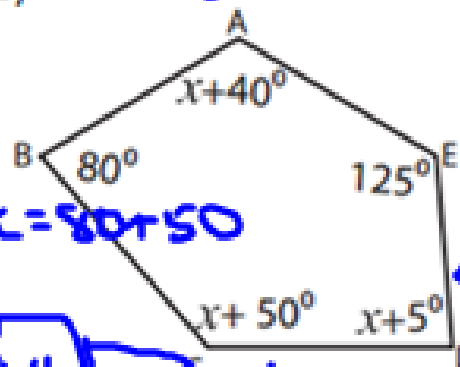
∠C=80+50

∠D=80+5

$(x+40)+(80)+(x+50)+(x+5)+125=540$

$3x+300=540$
$-300 \quad -300$

$\dfrac{3x}{3}=\dfrac{240}{3}$

$x=80$

Angle Sum = 540° x = 80
∠A = 120° ∠C = 130°
∠D = 85°

D) Quadrilateral W, Z, X, Y:
- W: 120°
- Z: 70°
- X: x-30°
- Y: x+20°

Angle Sum = _____ x = _____
∠X = _____ ∠Y = _____

E) Hexagon M, L, H, K, I, J:
- M: 140°
- L: 105°
- H: x+5°
- K: x+30°
- x-5°
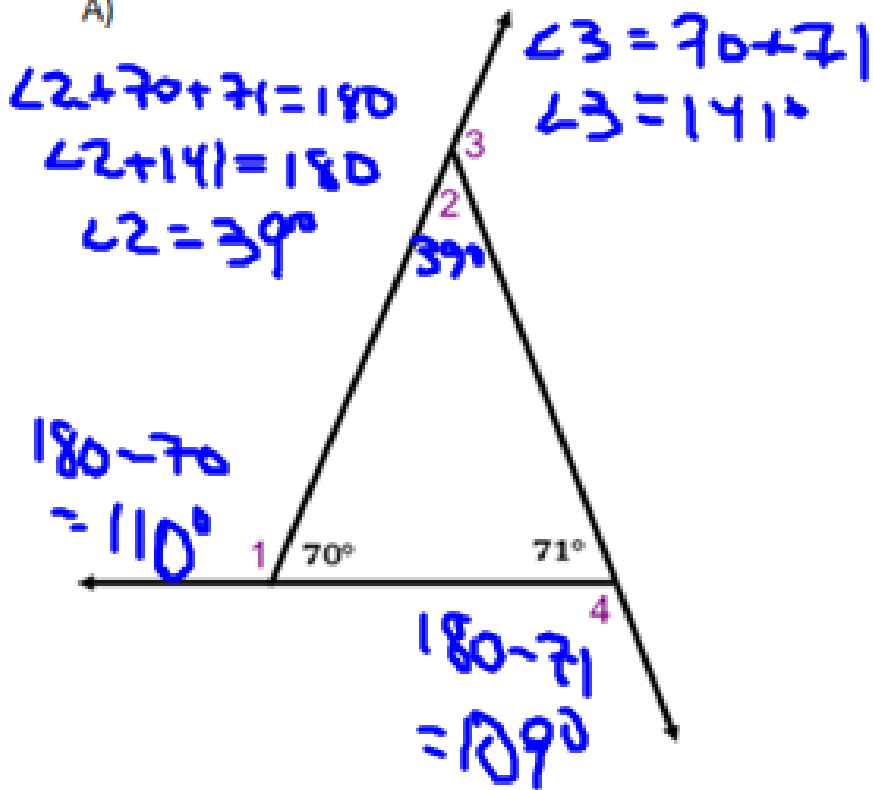- 130°
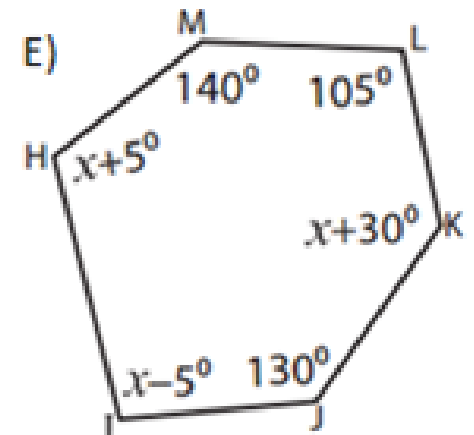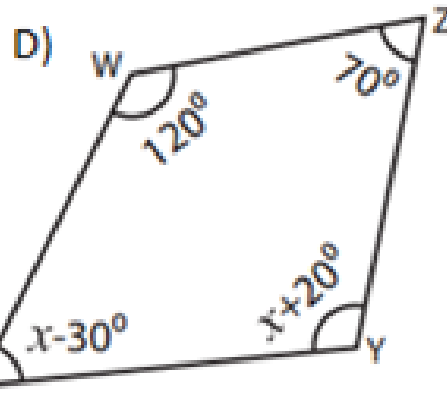
Angle Sum = _____ x = _____
∠H = _____ ∠I = _____
∠K = _____

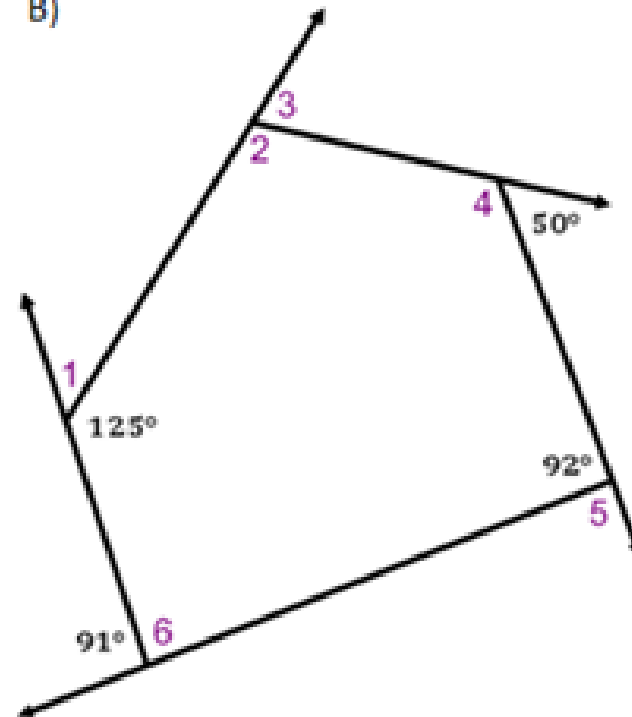3) What is the sum of the measures of the exterior angles of any polygon?

$$360°$$

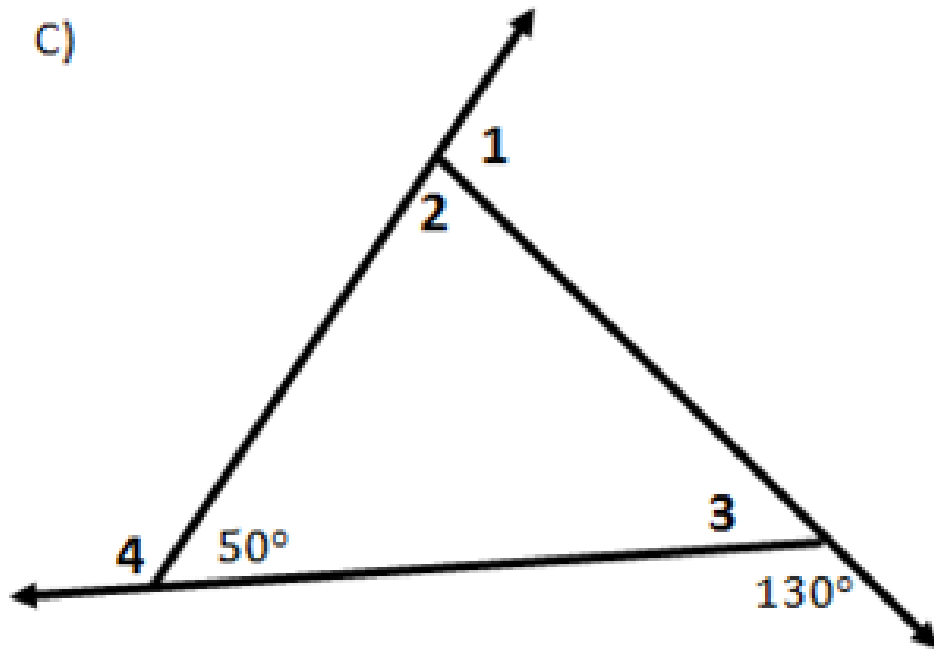4) Find the measurement of each missing angle. SHOW WORK AND LABEL

A)

$\angle 3 = 70 + 71$
$\angle 3 = 141°$

$\angle 2 + 70 + 71 = 180$
$\angle 2 + 141 = 180$
$\angle 2 = 39°$

$180 - 70$
$= 110°$

1 / 70°   71°

$180 - 71$
$= 109°$

$\angle 1 = \underline{110°}$ $\angle 2 = \underline{39°}$

$\angle 3 = \underline{141°}$ $\angle 4 = \underline{109°}$

B)

3
2
4 50°

1
125°

92°
5

91° 6

$\angle 1 = \underline{\hspace{1cm}}$ $\angle 2 = \underline{\hspace{1cm}}$ $\angle 3 = \underline{\hspace{1cm}}$

$\angle 4 = \underline{\hspace{1cm}}$ $\angle 5 = \underline{\hspace{1cm}}$ $\angle 6 = \underline{\hspace{1cm}}$
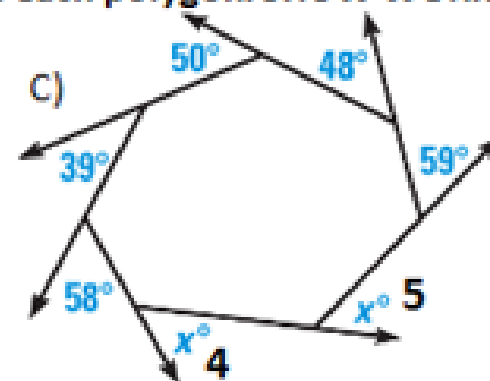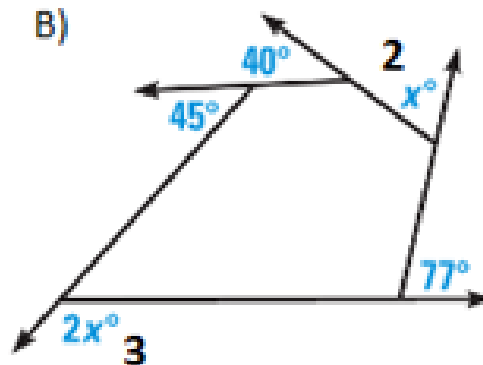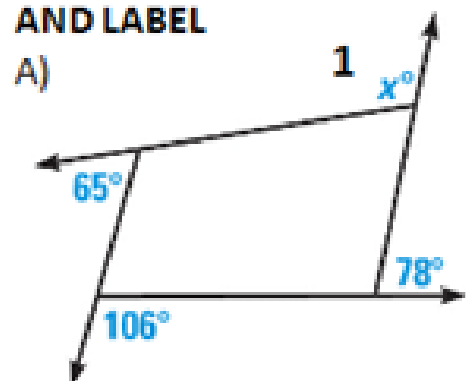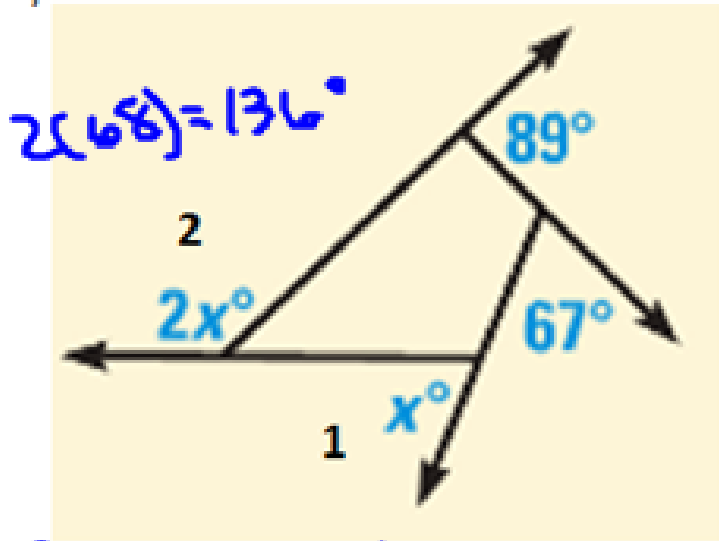
C)

∠1 = _____ ∠2 = _____

∠3 = _____ ∠4 = _____

5) Create and solve an equation to find the value of x and the missing angle of each polygon. SHOW WORK AND LABEL

A)

1
$x°$
65°
78°
106°

B)

40°
45°
2
$x°$
77°
$2x°$ 3

C)

50°
48°
39°
59°
58°
$x°$ 5
$x°$ 4

$x =$ _____ $\angle 1 =$ _____

$x =$ _____ $\angle 2 =$ _____

$\angle 3 =$ _____

$x =$ _____ $\angle 4 =$ _____

$\angle 5 =$ _____

D)

$2(68) = 136°$

$89°$

2

$2x°$

$67°$

1 $x°$

$(x) + 2x + 89 + 67 = 360$

$3x + 156 = 360$

$ -156 \quad -156$

$\dfrac{3x}{3} = \dfrac{204}{3} \qquad x = 68$

$x = \underline{68} \qquad \angle 1 = \underline{68°}$

$\angle 2 = \underline{136°}$

E)

$40°$

$3x - 10°$

1 2

$5x°$

$2x°$

$30°$ 3

$x = \underline{} \qquad \angle 1 = \underline{}$

$\angle 2 = \underline{} \qquad \angle 3 = \underline{}$