

AK

Name: _____

7.1 Practice Problems: Angles of Polygons

1. Find (a) the sum of the interior angles of a polygon, (b) each interior angle of a regular polygon, (c) the sum of the exterior angles of each polygon and (d) each exterior angle of a regular polygon given each polygon.

i) Quadrilateral

a) $(4-2)180 = 360^\circ$

b) $360/4 = 90^\circ$

c) 360°

d) $360/4 = 90^\circ$

ii) Pentagon

a) $(5-2)180 = 540^\circ$

b) $540/5 = 108^\circ$

c) 360°

d) $360/5 = 72^\circ$

iii) Dodecagon

a) $(12-2)180 = 1800$

b) $1800/12 = 150$

c) 360°

d) $360/12 = 30$

iv) 25-gon

a) $(25-2)180 = 4140^\circ$

b) $4140/25 = 165.6^\circ$

c) 360

d) $360/25 = 14.4$

2. Given the sum of the interior angles of an n-gon, find the number of sides, n.

i) 1800°

$$\frac{1800}{180} = \frac{180(n-2)}{180}$$

of Δ 's $\rightarrow 10 = n-2$

$12 = n$

ii) 4860°

$$\frac{4860}{180} = \frac{180(n-2)}{180}$$

$27 = n-2$

$29 = n$

3. Given the measure of each exterior angle of a regular polygon, find the number of sides n.

i) 20°

$$\frac{360}{n} = 20$$

$$\frac{360}{20} = n$$

$n = 18$

ii) 1°

$$\frac{360}{n} = 1$$

$$\frac{360}{1} = n$$

$n = 360$

4. Given the measure of each interior angle of a regular polygon, find the measure of each exterior angle.

i) 156°

$$180 - 156 = 24$$

↑
Each exterior angle.

$$\frac{360}{n} = 24$$

$$\frac{360}{24} = n \rightarrow n = 15$$

ii) 170°

$$180 - 170 = 10$$

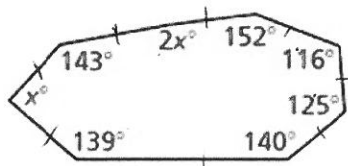
↑
Each exterior angle.

$$\frac{360}{n} = 10$$

$$\frac{360}{10} = n$$

$36 = n$

5. Find the value of each variable.

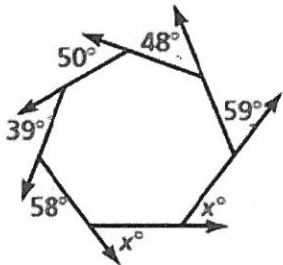


$n=8$

$$(8-2)180 = x + 143 + 2x + 152 + 116 + 125 + 140 + 139$$

$$1080 = 3x + 815$$

$$265 = 3x \rightarrow x = 88.\overline{33}$$

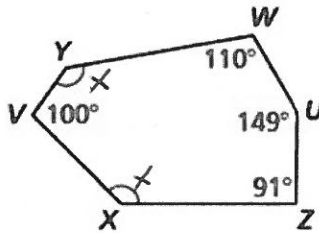


$$59 + 48 + 50 + 39 + 58 + 2x = 360$$

$$254 + 2x = 360$$

$$2x = 106$$

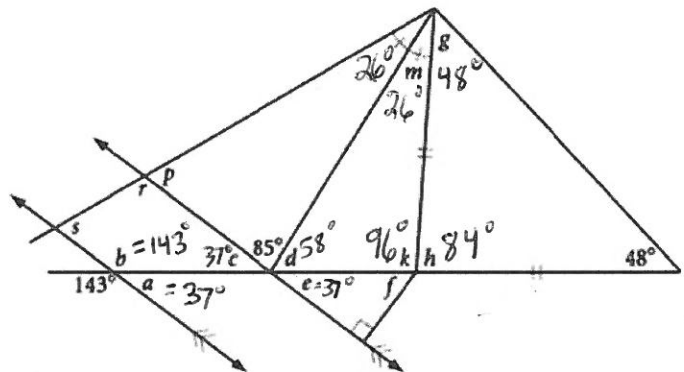
$$x = 53$$



$$100 + 110 + 149 + 91 + 2x = 720$$

$$2x = 270$$

$$x = 135^\circ$$



6. Write a formula that finds the number of sides n of a polygon in terms of the measure of each interior angle x assuming the polygon is regular.

$$x = \frac{(n-2)180}{n}$$

$$xn = (n-2)180$$

$$xn = 180n - 360$$

$$360 = 180n - xn$$

$$\frac{360}{180-x} = n$$

7. Which of the following angle measures are possible interior angle measures of regular polygons? Select all that apply.

Int \angle 162

171

(can't have

75 decimal 180

1

40

Ext \angle 18°

49°

105° sides)

179°

140°

$n \frac{360}{18} = 174$

40

304 ✓

$\frac{360}{0} = \text{und.}$

$\frac{360}{174} = 2.01$

$\frac{360}{140} = 2.6$

8. You are given a convex polygon. You are asked to draw a new polygon by increasing the sum of the interior angle measures by 540 degrees. How many more sides does your new polygon have? Explain.

$$\frac{540}{180} = 3 \text{ triangles} \rightarrow +3 \text{ sides.}$$