

7.1 Practice Problems: Angles of Polygons

1. For a regular 25-gon, find (a) the sum of the interior angles of a polygon, (b) the measure of each interior angle, (c) the sum of the exterior angles and (d) the measure of each exterior angle.

a)  $(25-2)180$   
 $4140^\circ$                       c)  $360^\circ$

b)  $\frac{4140^\circ}{25} = 165.6^\circ$                       d)  $14.4^\circ$

2. Given the sum of the interior angles of a polygon, find the number of sides, n.

a)  $1800^\circ$

$1800 = (n-2)180$   
 $10 = n-2$   
 $12$

b)  $4860^\circ$

$4860^\circ = (n-2)180$   
 $27 = n-2$   
 $29$

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

a)  $20^\circ$

$\frac{360^\circ}{20^\circ} = 18$

b)  $1^\circ$

$\frac{360^\circ}{1^\circ} = 360$

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

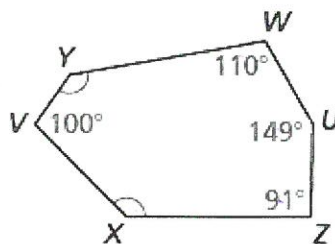
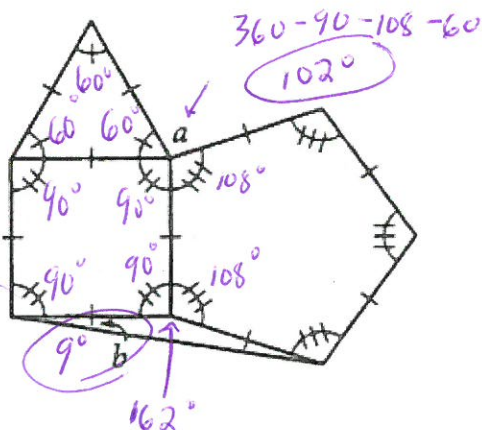
a)  $156^\circ$

$180 - 156 = 24^\circ$   
 $\frac{360}{24} = 15$  Sides

b)  $170^\circ$

$10^\circ$   
 $\frac{360}{10} = 36$  Sides

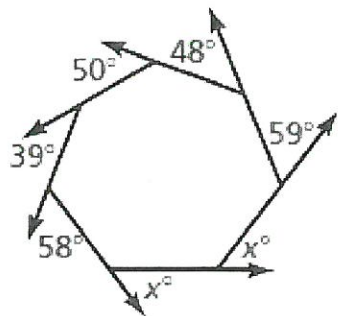
5. Find the measure of each missing angle.



$72^\circ$   
 $-110$   
 $-149$   
 $-91$   
 $-100$   

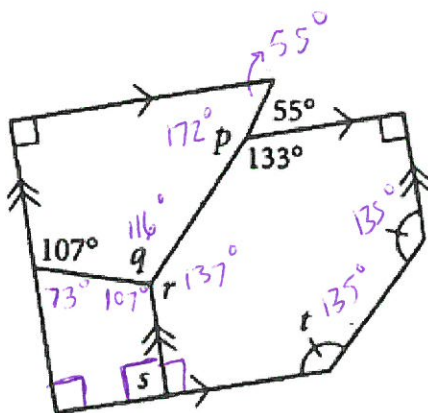

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 $\frac{270}{2} = 135^\circ$



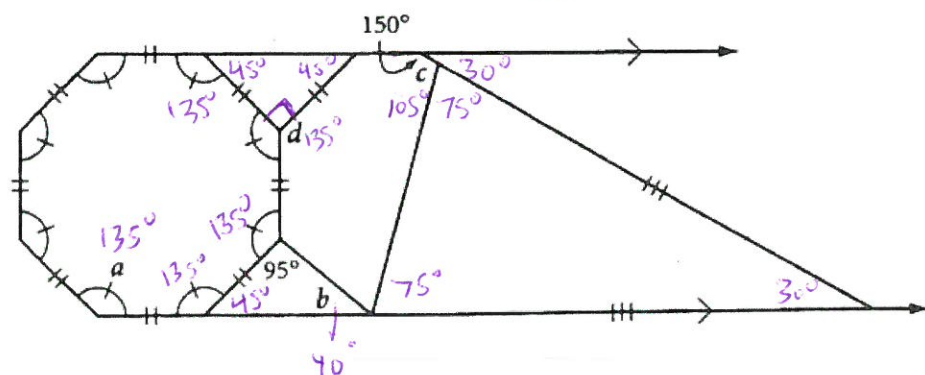
$$\begin{array}{r}
 360 \\
 -59 \\
 -48 \\
 -50 \\
 -39 \\
 -58 \\
 \hline
 106
 \end{array}$$

$$106/2 = 53^\circ$$



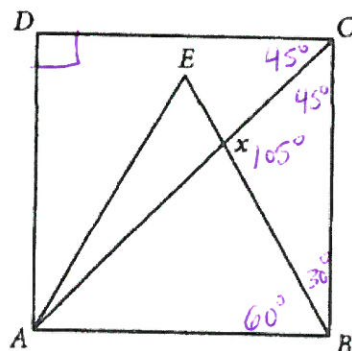
$$\begin{array}{r}
 720 \\
 -90 \\
 -90 \\
 -133 \\
 -137 \\
 \hline
 270
 \end{array}$$

$$270/2 = 135^\circ$$



ABCD is a square.  
ABE is an equilateral triangle.

$$x = 105^\circ$$



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

162

$$\frac{360}{18} = 20$$

171

$$\frac{360}{9} = 40$$

~~75~~

$$\frac{360}{109} = 3.4$$

~~180~~

$$\frac{360}{0}$$

~~1~~

$$\frac{360}{179} \approx 2.1$$

~~40~~

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

7. 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.

Each  $\Delta$  is 180 degrees, so add  $3 \times 180 = 540$   
 $\downarrow$   
 sides