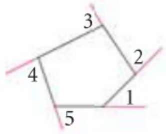
Theorem 3-15 **Polygon Exterior Angle-Sum Theorem**

The sum of the measures of the exterior angles of a polygon, one at each vertex, is 360.

For the pentagon,
$m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5 = 360.$



Find the measure of each exterior angle of a regular 30-gon.

EXT

$\frac{360°}{30} = 12°$

INT

$(30-2)180 = 5040°$

$1 \text{ int} \angle = \frac{5040}{30}$

$= 168°$

168° ext = 12

Find the number of sides that a regular polygon must have if each exterior angle equals 8°

Exterior Angles

Int 8° = EXT

$\frac{360°}{8°} = 45$ sides

Interior Angles

172 8°

$\frac{(n-2)180}{n} = 172°$

$n = 45$

The measure of each interior angle of a regular polygon is 160°. Find the number of sides.

Interior Angles

$\frac{(n-2)180}{n} = 160$

$n = 18$

Exterior Angles

160 ? = 20

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

Can the measure of each exterior angle of a regular polygon have a measure of a 15°?

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

Yes

Since the number of sides turned out to be a whole number greater than 2.

Can the measure of each exterior angle of a regular polygon have a measure of a 21°?

$\frac{360}{21} = 17.14$

No, because the number of sides must be a **whole number** greater than 2.

Can the measure of each interior angle of a regular polygon have a measure of 155°?

155 ? 25

$\frac{(n-2)180}{n} = 155$

$n = 14.4$

OR

$\frac{360}{25} = 14.4$

No because the number of sides must be a whole number 14.4 isn't possible.

Can the measure of each interior angle of a regular polygon have a measure of 168°?

$\frac{360}{12} = 30$

Yes

Yes, because the number of sides turned out to be a whole number greater than 2.

Find the measure of each interior angle of a regular 40-gon.

INT

sum of interior angles divided by the number of sides.

$\frac{(40-2)180}{40}$

$= 171$

EXT

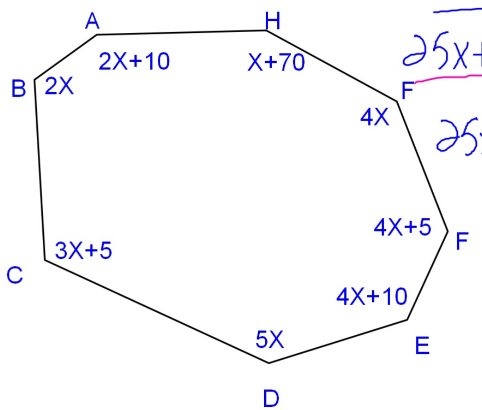
Sum of exterior angles divided by the number of sides.

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

$1 \text{ INT} = 180 - 9$

$= 171$

Find the value of x.



Sum of int ∠s

$25x + 100 = (8-2)180$

$25x + 100 = 1080$

$-100 \quad -100$

$\frac{25x}{25} = \frac{980}{25}$

$x = 39.2$

You can now finish Hwk #14.

Write the equation of the line that passes through the two points (-6, 15) and (2, -1)

Slope = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{15 + 1}{-6 - 2} = \frac{16}{-8} = -2$

Point-Slope Form

$y - y_1 = m(x - x_1)$

$y - y_1 = -2(x - x_1)$

$y - -1 = -2(x - 2)$

$y + 1 = -2(x - 2)$

Slope-Intercept Form

$y = mx + b$

$y = -2x + 3$

You can turn this into slope-inercept form by distributing the slope and subtracting 1 from both sides