1

$$x + y = 75$$

The equation above relates the number of minutes, x, Maria spends running each day and the number of minutes, y, she spends biking each day. In the equation, what does the number 75 represent?

A) The number of minutes spent running each day

B) The number of minutes spent biking each day

C) The total number of minutes spent running and biking each day

D) The number of minutes spent biking for each minute spent running

2

Which of the following is equivalent to $3(x + 5) - 6$?

A) $3x - 3$

B) $3x - 1$

C) $3x + 9$

D) $15x - 6$

$3X + 15 - 6$

$3X + 9$

3

$$x = y - 3$$
$$\frac{x}{2} + 2y = 6$$

Which ordered pair (x, y) satisfies the system of equations shown above?

A) $(-3, 0)$

B) $(0, 3)$

C) $(6, -3)$

D) $(36, -6)$

$\frac{X}{2} = 6 - 2y$

$X = 12 - 2y$

$y - 3 = 12 - 4y$

$5y = 15$

$y = 3$

4

Which of the following complex numbers is equal to $(5 + 12i) - (9i^2 - 6i)$, for $i = \sqrt{-1}$?

A) $-14 - 18i$

B) $-4 - 6i$

C) $4 + 6i$

D) $14 + 18i$

$i^2 = -1$

$5 + 12i - 9i^2 + 6i$

$5 + 12i + 9 + 6i$

$14 + 18i$

5

If $f(x) = \dfrac{x^2 - 6x + 3}{x - 1}$, what is $f(-1)$?

A) −5
B) −2
C) 2
D) 5

[handwritten:]
$$f(-1) = \frac{(-1)^2 - 6(-1) + 3}{(-1) - 1}$$
$$= \frac{1 + 6 + 3}{-2}$$
$$= \frac{10}{-2}$$

6

A company that makes wildlife videos purchases camera equipment for $32,400. The equipment depreciates in value at a constant rate for 12 years, after which it is considered to have no monetary value. How much is the camera equipment worth 4 years after it is purchased?

A) $10,800
B) $16,200
C) $21,600
D) $29,700

[handwritten:]
$$\frac{32,400}{12}$$
2700×4
$10,800$

7

$$x^2 + 6x + 4$$

Which of the following is equivalent to the expression above?

A) $(x + 3)^2 + 5$
B) $(x + 3)^2 - 5$
C) $(x - 3)^2 + 5$
D) $(x - 3)^2 - 5$

8

Ken is working this summer as part of a crew on a farm. He earned $8 per hour for the first 10 hours he worked this week. Because of his performance, his crew leader raised his salary to $10 per hour for the rest of the week. Ken saves 90% of his earnings from each week. What is the least number of hours he must work the rest of the week to save at least $270 for the week?

A) 38
B) 33
C) 22
D) 16

[handwritten:]
$80
$0.9(10x + 80) \geq 270$
$9(x + 8) \geq 270$
$x + 8 \geq 30$
$x \geq 22$

Objective: I can find the sums of the measures of the exterior angles and interior angles of polygons.

Do "Explore and Reason" and Habits of Mind in your student companion, page 131.

Fill in the essential question for this section: How does the number of *sides* in a convex *polygon* relate to the sum of the measures of its *int/ext* angles?
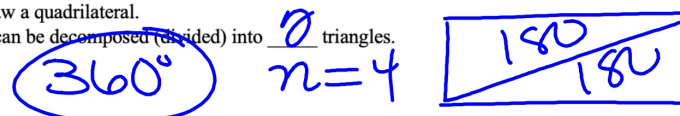
Example 1: How does the number of sides of a convex polygon, *n,* relate to the sum of the measures of its interior angles?

We know from earlier that the sum of the measures of the interior angles of a triangle is __180__
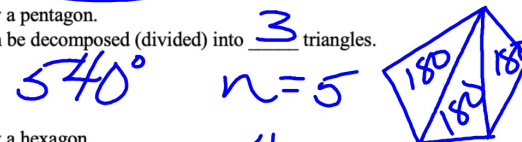
Draw a quadrilateral.
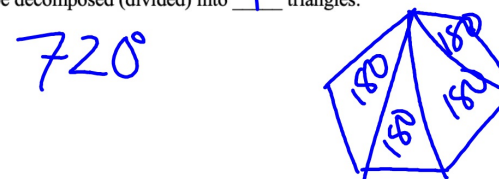It can be decomposed (divided) into __2__ triangles.

360° $n = 4$

Draw a pentagon.
It can be decomposed (divided) into __3__ triangles.

540° $n = 5$

Draw a hexagon.
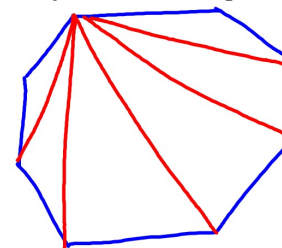It can be decomposed (divided) into __4__ triangles.

720°

What kind of pattern do you see? Can you derive a formula for a polygon with "n" sides?

There are $n-2$ △s in every n-sided polygon

Int ∠ sum of any polygon is $180(n-2)$

Do Try It 1, page 132 in your student companion.

1a.

5 diagonals
6 △s

b. $180(n-2)$
$180(8-2)$
$= 1080°$

This leads us to a theorem about the interior angles of a polygon.

Theorem 6-1: Polygon Interior Angle-Sum Theorem

The sum of the measures of the interior angles *of a* **convex polygon is** $180(n-2)$

If...

Then... $m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 + m\angle 5 + m\angle 6 + m\angle 7 = 180° \cdot (7-2) = 900°$

Additional Example: The school zone traffic sign has 3 right angles and the other 2 angles are congruent. Find the measure of the other two interior angles.
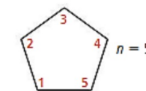
$180(5-2)$ $=135°$

$540 - 270 = \dfrac{270}{2}$

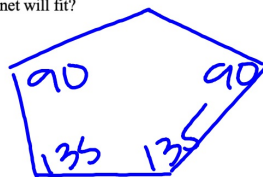**Corollary to Theorem 6-1**

The measure of a single interior angle *of a* **regular polygon is** $\dfrac{180(n-2)}{n}$

If...

$n = 5$

Then... $m\angle 1 = \dfrac{180° \cdot (5-2)}{5} = 108°$

Example 2: Jenna is building a corner cabinet to fit in a rectangular room. If she builds it with the angles shown, how can she determine whether the cabinet will fit?

90°   90°
135° 135°

90 90
135 135

1) To fit in a corner, what must the 5th angle be (the one that is not labeled)? **90°**

2) What is the sum of the interior angles? **540°**

3) Does this sum make sense with the polygon interior angle-sum theorem? **yes**

Do Try It 2 and Habits of Mind, page 132 in your student companion.

2a. $180(17-2)$
$180(15) = 2700°$

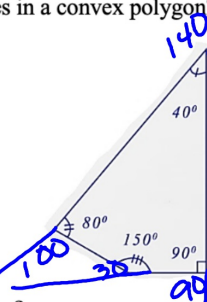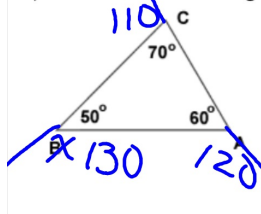2b. $172.8 = \dfrac{180(n-2)}{n}$
$172.8n = 180n - 360$
$-7.2n = -360$
$n = 50 \text{ sides}$

Example 3: What is the sum of the EXTERIOR angle measures in a convex polygon?

1) Find each exterior angle in the polygons below.

(handwritten annotations on triangle diagram)
110
C
70°
50°   60°
130   120

(handwritten annotations on second triangle diagram)
140
40°
80°
150°   90°
100   30   90

2) What do you notice about the sum of all of the exterior angles?

All add up to 360

3) Do you think this is true for all polygons, regardless of the number of sides?

yes