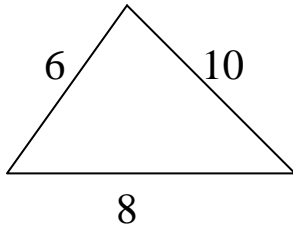


AROUND AND AROUND WE GO

Examples

A “polygon” is a closed figure formed by line segments. The “perimeter” of a “polygon” is the sum of the lengths of its sides.

Example # 1 – What is the perimeter for the polygon below?



Use definition of perimeter

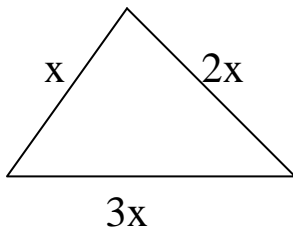
$$P = 6 + 10 + 8$$

$$P = 24$$

Perimeter is 24

Discussion Question 1 – Have students create a four-sided figure with a perimeter of 28. The only restriction is – the figure cannot be a “rhombus (4 congruent sides).” Then have students share their polygon with the class. **Emphasize to the students that many polygons may have the same perimeter.**

Example # 2 – What is the perimeter for the polygon below?



Use definition of perimeter

$$P = x + 2x + 3x$$

$$P = 6x$$

Perimeter is $6x$

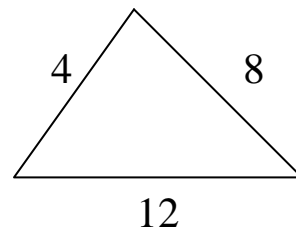
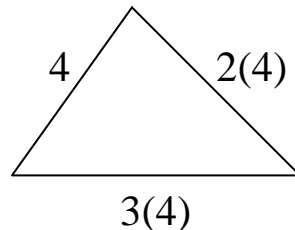
Example # 3 – If the perimeter for **EXAMPLE # 2** is 24 inches, then find the measure for each side.

Use definition of perimeter

$$24 = x + 2x + 3x$$

$$24 = 6x$$

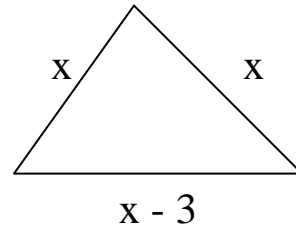
$$4 = x$$



Example # 4 – In a certain isosceles triangle, the third side is 3 inches shorter than either of the congruent sides. If the perimeter is 69 inches, find the lengths of the sides.

Explore – Let the following expressions represent the lengths of the sides.

$$\begin{array}{c} x \\ (x - 3) \end{array}$$



Plan – Recall that the Perimeter of a triangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

First side + second side + third side = perimeter of triangle.

Solve → $x + x + (x - 3) = 69$
 $3x - 3 = 69$
 $3x = 72$
 $x = 24$

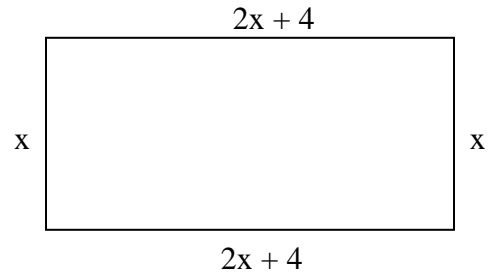
Therefore, the length of each congruent side is 24 inches. The length of the third side is $(24 - 3)$ or 21 inches.

Examine – The sum of the lengths of the three sides is $24 + 24 + 21$ or 69 inches.

Example # 5 – The length of a rectangle is 4 feet more than twice the width. The perimeter is 116 feet. Find the dimensions of the rectangle.

Explore – Let the following expressions represent the lengths of the sides.

$$\begin{aligned}\text{Width} &= x \\ \text{Length} &= 2x + 4\end{aligned}$$



Plan – Recall that the Perimeter of a rectangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

First side + second side + third side + fourth side = perimeter of rectangle.

Solve → $x + x + (2x + 4) + (2x + 4) = 116$
 $6x + 8 = 116$
 $6x = 108$
 $x = 18$

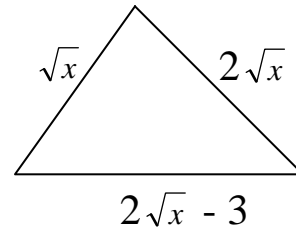
Therefore, the width of the rectangle is 18 feet and the length is $2(18) + 4$ or 40 feet.

Examine – The sum of the lengths of the four sides is $18 + 18 + 40 + 40$ or 116 feet.

Example # 6 – The second side of a triangle is twice the length of the first. The third side is 3 cm less than the second side. If the length of the first side is \sqrt{x} , then what are the lengths of all three sides if the perimeter is 37 cm?

Explore – Let the following expressions represent the lengths of the sides.

$$\begin{aligned}\text{First side} &= \sqrt{x} \\ \text{Second side} &= 2\sqrt{x} \\ \text{Third side} &= 2\sqrt{x} - 3\end{aligned}$$



Plan – Recall that the Perimeter of a triangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

$$\text{First side} + \text{second side} + \text{third side} = \text{perimeter of triangle.}$$

Solve $\rightarrow \sqrt{x} + 2\sqrt{x} + (2\sqrt{x} - 3) = 37$

$$5\sqrt{x} - 3 = 37$$

$$5\sqrt{x} = 40$$

$$\sqrt{x} = 8 \rightarrow x = 64$$

Therefore, the length of the first side is 8 cm, the second side $2(\sqrt{64})$ or 16 cm, and the third side is $2(\sqrt{64}) - 3$ or 13 cm.

Examine – The sum of the lengths of the three sides is $8 + 16 + 13$ or 37.

AROUND AND AROUND WE GO

Worksheet

For each problem, draw a diagram and label. Then use the four-step approach to problem solving:

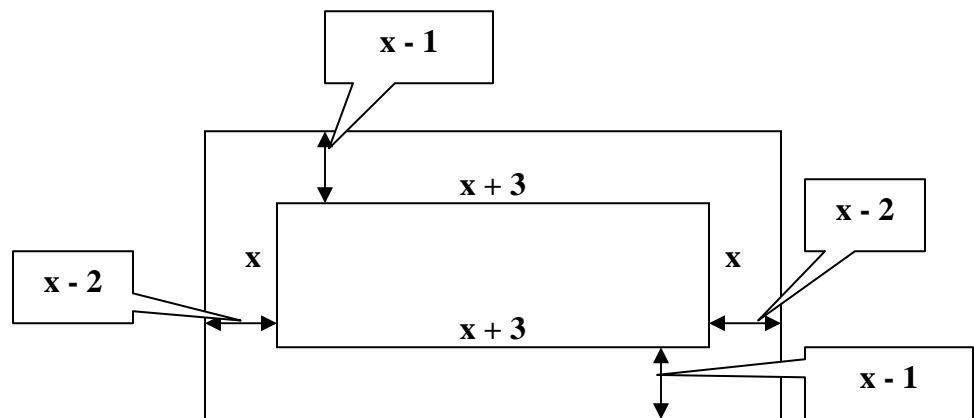
- a. Explore “Define a variable.”
- b. Plan “Write an equation.”
- c. Solve “Solve the equation and answer the problem.”
- d. Examine “Check to see if the answer makes sense.”

1. The perimeter of a football field is 1040 feet. The length of the field is 120 feet less than 3 times the width. What are the dimensions of the field?

2. The sides of a triangle are $4\sqrt{x}$, $2\sqrt{x} + 6$, and $7\sqrt{x} - 9$. If the perimeter of the triangle is 62 inches, find the lengths of the three sides.

3. The three sides of a triangle have measures that are consecutive odd integers. What are the lengths of the sides if the perimeter is 87 m?

4. In the figure below, the perimeter of the outside rectangle is 54 feet. Find the dimensions of each rectangle.



AROUND AND AROUND WE GO

Worksheet Key

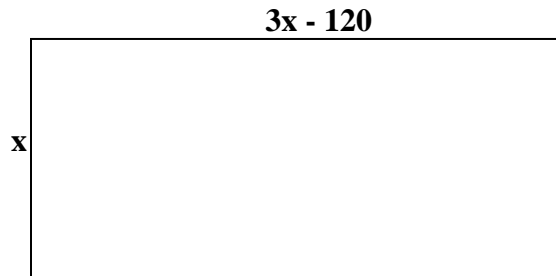
For each problem draw a diagram and label. Then use the 4-step approach to problem solving:

- Explore “Define a variable”
- Plan “Write an equation”
- Solve “Solve the equation and answer the problem”
- Examine “Check to see if the answer makes sense”

- The perimeter of a football field is 1040 feet. The length of the field is 120 feet less than 3 times the width. What are the dimensions of the field?

Explore – Let the following expressions represent the lengths of the sides.

$$\begin{aligned}\text{Width} &= x \\ \text{Length} &= 3x - 120\end{aligned}$$



Plan – Recall that the Perimeter of a rectangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

First side + second side + third side + fourth side = perimeter of rectangle.

Solve → $x + x + (3x - 120) + (3x - 120) = 1040$
 $8x - 240 = 1040$
 $8x = 1280$
 $x = 160$

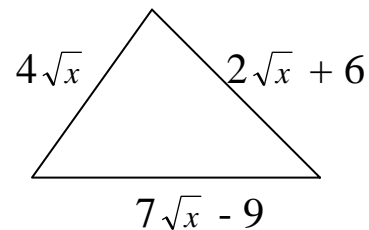
Therefore, the width of the rectangle is 160 feet and the length is $3(160) - 120$ or 360 feet.

Examine – The sum of the lengths of the four sides is $160 + 160 + 360 + 360$ or 1040 feet.

2. The sides of a triangle are $4\sqrt{x}$, $2\sqrt{x} + 6$, and $7\sqrt{x} - 9$. If the perimeter of the triangle is 62 inches, find the lengths of the three sides.

Explore – Let the following expressions represent the lengths of the sides.

$$\begin{aligned}\text{First side} &= 4x \\ \text{Second side} &= 2x + 6 \\ \text{Third side} &= 7x - 9\end{aligned}$$



Plan – Recall that the Perimeter of a triangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

$$\text{First side} + \text{second side} + \text{third side} = \text{perimeter of triangle.}$$

Solve $\rightarrow 4\sqrt{x} + (2\sqrt{x} + 6) + (7\sqrt{x} - 9) = 62$

$$13\sqrt{x} - 3 = 62$$

$$13\sqrt{x} = 65$$

$$\sqrt{x} = 5 \rightarrow x = 25$$

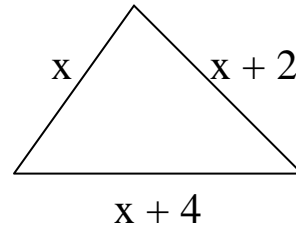
Therefore, the length of the first side is $4(\sqrt{25})$ or 20 in, the second side $2(\sqrt{25}) + 6$ or 16 in, and the third side is $7(\sqrt{25}) - 9$ or 26 in.

Examine – The sum of the lengths of the three sides is $20 + 16 + 26$ or 62 inches.

3. The three sides of a triangle have measures that are consecutive odd integers. What are the lengths of the sides if the perimeter is 87 m?

Explore – Let the following expressions represent the lengths of the sides.

$$\begin{aligned}\text{First side} &= x \\ \text{Second side} &= x + 2 \\ \text{Third side} &= x + 4\end{aligned}$$



Plan – Recall that the Perimeter of a triangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

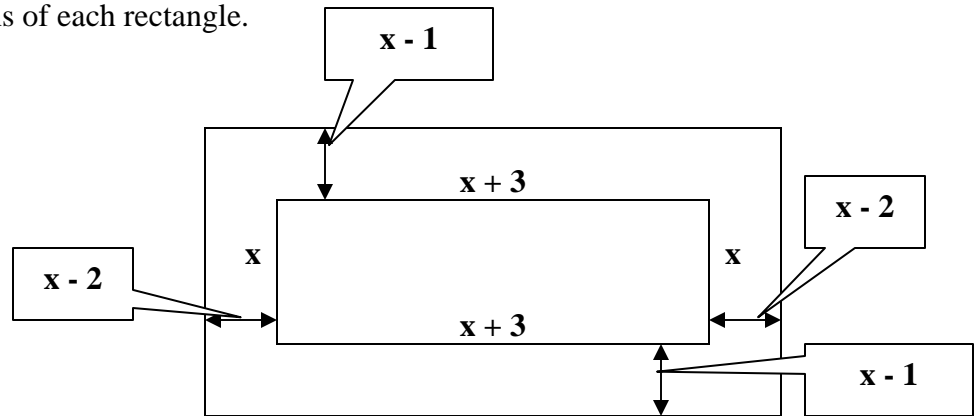
$$\text{First side} + \text{second side} + \text{third side} = \text{perimeter of triangle.}$$

Solve → $x + (x + 2) + (x + 4) = 87$
 $3x + 6 = 87$
 $3x = 81$
 $x = 27$

Therefore, the length of the first side is 27 m, the second side $(27 + 2)$ or 29m, and the third side is $(27 + 4)$ or 31m.

Examine – The sum of the lengths of the three sides is $27 + 29 + 31 = 87\text{m}$.

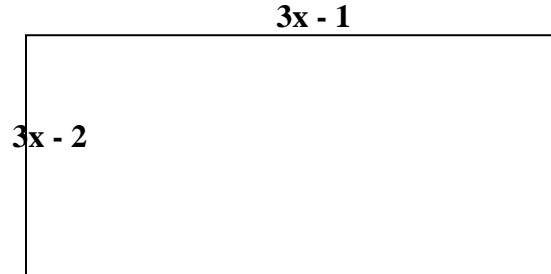
4. In the figure below, the perimeter of the outside rectangle is 54 feet. Find the dimensions of each rectangle.



Explore – Let the following expressions represent the lengths of the sides for the outside rectangle.

$$\text{Width} = x + (x - 1) + (x - 1) \text{ or } 3x - 2$$

$$\text{Length} = (x + 3) + (x - 2) + (x - 2) \text{ or } 3x - 1$$



Plan – Recall that the Perimeter of a rectangle is the sum of the lengths of its sides. To find these lengths, solve the following equation.

$$\text{First side} + \text{second side} + \text{third side} + \text{fourth side} = \text{perimeter of rectangle.}$$

Solve $\rightarrow (3x - 2) + (3x - 1) + (3x - 2) + (3x - 1) = 54$

$$12x - 6 = 54$$

$$12x = 60$$

$$x = 5$$

Therefore, the width of the outside rectangle is $3(5) - 2$ or 13 feet and the length, of outside rectangle, is $3(5) - 1$ or 14 feet.

The inside dimensions are width = 5 feet and length = $5 + (3) = 8$ feet.

Examine – The sum of the lengths of the four sides, for the outside rectangle, is $13 + 14 + 13 + 14 = 54$ feet.

Student Name: _____

Date: _____

AROUND AND AROUND WE GO Checklist

Choose one:


1. On each problem, did the student diagram and label problem correctly?
 - a. All four (30 points)
 - b. Three of the four (25 points)
 - c. Two of the four (20 points)
 - d. One of the four (15 points)

2. On each problem, did the student use the four-step approach to problem solving?
 - a. All four (30 points)
 - b. Three of the four (25 points)
 - c. Two of the four (20 points)
 - d. One of the four (15 points)

3. On each problem, did the student solve the problem correctly?
 - a. All four (30 points)
 - b. Three of the four (25 points)
 - c. Two of the four (20 points)
 - d. One of the four (15 points)

Total Number of Points _____

- A 81 points and above
- B 72 points and above
- C 63 points and above
- D 54 points and above
- F 53 points and



**Any score below C
needs
remediation!**