**Lesson Objective:** Students will be able to determine the perimeter of a rectangle and manipulate the perimeter formula to solve for unknown variables

Important terminology for perimeter

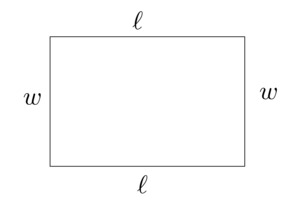
**Rectangle**- a four sided polygon with four right angles

**Perimeter** – the distance around a polygon

**Perimeter formula for a rectangle** --

Perimeter = (2 x length) + (2 x width)=

*P = 2l + 2w or P = 2(l +w)*



Example 1 - Find the perimeter of a yard that is 160 feet long and 78 feet wide

Use one of the formulas for Perimeter

*P = 2l + 2w or P = 2(l +w)*

Plug in the known values and solve

P= 2(160) + 2(78) or P= 2(160 +78)

P= 320 + 156 or P = 2(238)

P= 476 feet or P = 476 feet

Try it 1:

Find the perimeter of a room that measures 11 feet 2 inches by 9 feet.

Use one of the formulas for Perimeter

*P = 2l + 2w or P = 2(l +w)*

Plug in the known values and solve

P= 2(11 feet 2 inches) + 2(9 feet) or P= 2(11 feet 2 inches +9 feet)

P= 22 feet 4 inches + 18 feet or P = 2(20 feet 2 inches)

P= 40 feet 4 inches or P = 40 feet 4 inches

**Example 2:** You use 56 feet of crown molding to finish a rectangular room. One side of the room is 15 feet long. How long can the other side of the room?

Use the formula for perimeter

*P = 2l + 2w*

Plug in the known values and solve

In this case, we know the perimeter. It is 56 feet. That is how much material you used to go around the room. We also know the length of one of the sides of the room

To solve for an unknown variable

Example: 3x + 10 = 25

1) Combine any like terms on each side of the equation

2) Locate the term with the variable (in this example, the 3x)

3) Get the variable term by itself by “doing the opposite math” to both sides of the equation (the 10 is being ADDED to the 3x, so you will SUBTRACT 10 from both sides)

3x +10=25

-10 -10

3x=15

4) \*\*Finally the get the variable by itself by dividing both sides of the equation by the number in front of the variable

3x=15

3 3

x=5

The solution is x = 5

56 = 2(15) + 2w

We need to find the value of w

56 = 30 + 2w

-30 -30 Subtract 30 from both sides

26 = 2w

26 = 2w Divide both sides by 2

2 2

13 = w

The length of other side of the room is

13 feet

Try it 2: Bill uses 250 feet of fencing to enclose his garden. One side is 55 feet long. How long is the other side?

Use the Perimeter Formula=

P = 2l + 2w

250 = 2(55) + 2w

250 = 110 + 2w Subtract 110 from each side

-110 -110

140 = 2w

140 = 2w Divide both sides by 2

2 2

70 = w

The other side is 70 feet long

Example 3:

A rectangle has a perimeter of 78 inches. The length is 9 inches longer than the width. What is the length and width of the rectangle?

P = 2w + 2l

We don’t have a measurement for length or width. We do know:

Length is 9 inches longer than the width

Translate this to “math”

Is means “=”

*l = 9 + w* The length is 9 inches LONGER (+) than the width

SUBTITUTE this in for *l*

Insert the values that we know, including our substitution

Use the distributive property to simplify the equation

Combine any like terms

Now we can get the variable by itself. Subtract 18 from both sides

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Divide both sides by 4

We have solved for w, which is the width.

Now we need to plug this back into the equation we used for l, *l = 9 + w*

*l = 9+ 15*

*l= 24*

Final answer: w= 15 inches and l = 24 inches

Check your answer:

Is 78 = 2(15) + 2(24)

78 = 30 + 48

78 = 78 TRUE! Answer is correct

Try it 3:

A rectangle has a perimeter of 34 feet. The width is 3 feet shorter than the length. What are the lengths of the sides of the triangle?

P = 2w + 2l

We don’t have a measurement for length or width. We do know:

Width is 3 feet shorter than the length

Translate this to “math”

Is means “=”

*w= l-3* The width is 3 feet SHORTER (-) than the width

SUBTITUTE this in for w

Insert the values that we know, including our substitution

*34 = 2(l-3) + 2l* Use the distributive property to simplify the equation

*34 = 2l – 6 + 2l* Combine any like terms

*34 = 4l -6* Now we can get the variable by itself. Add 6 to both sides

*+6 +6*

*40 = 4l*

*40 =4l*  Divide both sides by 4

*4 4*

*10 = l*  We have solved for l, which is the length.

Now we need to plug this back into the equation we used for w, *w = l - 3*

*w= 10 – 3*

*w= 7*

Final answer: w= 7 feet and l = 10 feet

Check your answer:

Is *34 = 2(7) + 2(10)*

*34 = 14 + 20*

34= 34 TRUE! Answer is correct