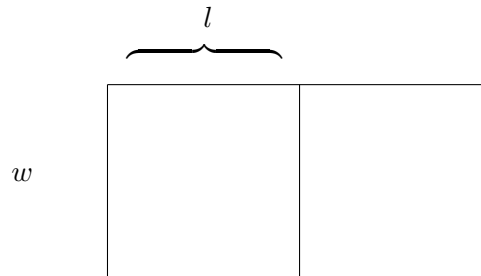


Worksheet Key # 2

Don't forget to use your neighbors and play around with the ideas presented here.

1. Everyone knows the formula $Area = width \times length$ for a rectangular field. The formula gets more complicated if you want to construct two corrals of equal size as in the figure below.



Come up with an equation that represents the *Area* of the two corrals. Enter it into the **Numeric Solver** in your calculator and answer the following questions.

Find the *Area* if:

$$w = 15$$

$$l = 27$$

$$A = 810$$

$$w = 55$$

$$l = 220$$

$$A = 24,200$$

$$w = 55 \qquad l = 550 \qquad \boxed{A = 60,500}$$

$$w = 200 \qquad l = 75 \qquad \boxed{A = 30,000}$$

$$w = -8 \qquad l = 103 \qquad \boxed{A = -1648}$$

Find the *width* if:

$$l = 100 \qquad A = 6785 \qquad \boxed{w = 33.925}$$

$$l = 525 \qquad A = 185,000 \qquad \boxed{w = 176.19}$$

$$l = 430 \qquad A = 260,580 \qquad \boxed{w = 303}$$

$$l = 600 \qquad A = 878,400 \qquad \boxed{w = 732}$$

Find the *length* if:

$$w = 25 \qquad A = 6,250 \qquad \boxed{l = 125}$$

$$w = 73.5 \qquad A = 12,300 \qquad \boxed{l = 83.67}$$

$$w = 79 \qquad A = 22,752 \qquad \boxed{l = 144}$$

$$w = \frac{1}{100} \qquad A = 3 \qquad \boxed{l = 150}$$

Find the equation for the *Perimeter* of our two corrals and enter it into the **Numeric Solver**. Answer the following questions.

Find the *Perimeter* if:

$$w = 25 \qquad l = 36 \qquad \boxed{P = 219}$$

$$w = 120 \qquad l = 180 \qquad \boxed{P = 1080}$$

$$w = 43.789 \qquad l = 59.231 \qquad \boxed{P = 368.291}$$

Find *length* if:

$$w = 75 \qquad P = 550 \qquad \boxed{l = 81.25}$$

$$w = 23 \qquad P = 293 \qquad \boxed{l = 56}$$

$$w = 100 \qquad P = 726 \qquad \boxed{l = 106.5}$$

$$w = 2,250 \qquad P = 1,000 \qquad \boxed{l = -1437.5}$$

Find the *width* if:

$$l = 32.3 \qquad P = 185.3 \qquad \boxed{w = 18.7}$$

$$l = 37 \qquad P = 160 \qquad \boxed{w = 4}$$

$$l = 200 \qquad P = 1367 \qquad \boxed{w = 189}$$

$$l = 8 \qquad P = .01 \qquad \boxed{w = -10.663}$$

2. Let's investigate an equation that can have more than one solution.

Enter the following using the *times* button, $\boxed{\times}$,

$$a \cdot x^2 + b \cdot x + c = 0$$

into your **Numeric Solver**.

Give the variables the following values,

$$a = -1 \quad , \quad b = 2.5 \quad , \quad c = 21 \quad .$$

The remaining unknown x has two possible solutions. One near -5 and one near 5 . Find them.

Answer: $x = 6$ and $x = -3.5$

Give the variables the values $a = -1$, $b = .5$, $c = 5$, and find the two solutions.

Answer: $x = 10$ and $x = -5$

Given $a = \frac{1}{6}$, $b = 3 + \frac{1}{3}$, $c = 5 + \frac{1}{3}$. Both the solutions for x are negative. Find them.

Answer: $x = -1.7538$ and $x = -18.246$

Given $a = .25$, $b = -7$, $c = 49$. There is only one solution for x . Find it.

Answer: $x = 14.000$

Suppose we want $x = 2$ to be a solutions of the equation. Let $b = 6$ and $c = -3$. What does the **Numeric Solver** get for a ?

Answer: $a = -2.25$

3. Let us use the **Numeric Solver** for economics, enter the following cost function.

$$\text{cost} = \text{fixed} + a \cdot q^3 + b \cdot q^2 + c \cdot q$$

Give the variables the following values,

$$\text{fixed} = 2000$$

$$a = .0033$$

$$b = -1.5$$

$$c = 225$$

To find the cost producing a quantity of 150 units make $q = 150$. Find the cost.

Answer: $\text{cost} = 13,137.5$

Find the cost for $q = 50, 100,$ and 200 .

Answer: $\text{cost}_1 = 9912.5$ $\text{cost}_2 = 12800$ $\text{cost}_3 = 13400$

Find what quantity keeps cost at \$12000.

Answer: $q = 78.195$

Change our variables to $a = .5$, $b = -2$, $c = 100$.

What happens to cost?

Answer: $\text{cost} = 236,653.40$

Solve the following systems of equations.

$$\begin{array}{rcl} -0.4x & + & 0.8y = 1.6 \\ 2x & - & 3y = 5 \end{array}$$

$$\begin{array}{rcl} 18x & + & 10y = 5 \\ 30x & + & 24y = 11 \end{array}$$

Answer: $x = 22$, $y = 13$

$x = 5/66$, $y = 4/11$