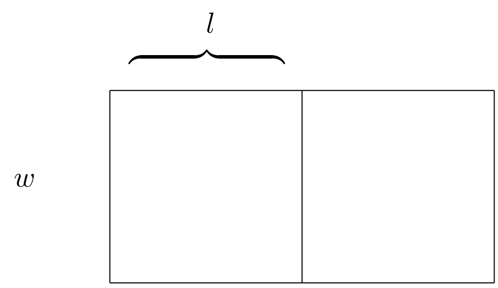
# Worksheet # 2

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:

$w = 15$ $l = 27$ $A =$

$w = 55$ $l = 220$ $A =$

| | | |
|---|---|---|
| $w = 55$ | $l = 550$ | $A =$ |
| $w = 200$ | $l = 75$ | $A =$ |
| $w = -8$ | $l = 103$ | $A =$ |

Find the *width* if:

| | | |
|---|---|---|
| $l = 100$ | $A = 6785$ | $w =$ |
| $l = 525$ | $A = 185,000$ | $w =$ |
| $l = 430$ | $A = 260,580$ | $w =$ |
| $l = 600$ | $A = 878,400$ | $w =$ |

Find the *length* if:

| | | |
|---|---|---|
| $w = 25$ | $A = 6,250$ | $l =$ |
| $w = 73.5$ | $A = 12,300$ | $l =$ |
| $w = 79$ | $A = 22,752$ | $l =$ |
| $w = \frac{1}{100}$ | $A = 3$ | $l =$ |

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:

| | | |
|---|---|---|
| $w = 25$ | $l = 36$ | $P =$ |

| | | |
|---|---|---|
| $w = 120$ | $l = 180$ | $P =$ |
| $w = 43.789$ | $l = 59.231$ | $P =$ |

Find *length* if:

| | | |
|---|---|---|
| $w = 75$ | $P = 550$ | $l =$ |
| $w = 23$ | $P = 293$ | $l =$ |
| $w = 100$ | $P = 726$ | $l =$ |
| $w = 2,250$ | $P = 1,000$ | $l =$ |

Find the *width* if:

| | | |
|---|---|---|
| $l = 32.3$ | $P = 185.3$ | $w =$ |
| $l = 37$ | $P = 160$ | $w =$ |
| $l = 200$ | $P = 1367$ | $w =$ |
| $l = 8$ | $P = .01$ | $w =$ |

2. Let's investigate an equation that can have more than one solution. Enter the following using the *times* button, $\boxed{\times}$,

$$a \cdot x\hat{}2 + b \cdot x + c \ = \ 0$$

into your **Numeric Solver**.

Give the variables the following values,

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

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

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

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

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

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 $a$?

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

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

Give the variables the following values,

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.

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

Find what quantity keeps cost at $12000.

Change our variables to $a = .5$ , $b = -2$ , $c = 100$.
What happens to cost?

Solve the following systems of equations.

$$\begin{array}{rcrcr} -0.4\,x & + & 0.8\,y & = & 1.6 \\ 2\,x & - & 3\,y & = & 5 \end{array} \qquad \begin{array}{rcrcr} 18\,x & + & 10\,y & = & 5 \\ 30\,x & + & 24\,y & = & 11 \end{array}$$

Done in TEX.