SM2 HANDOUT 5-6 (Quadratic Modeling: Area)

Quantity	Unit of Measure
Height	
Weight	
Temperature	

Sometimes ratios of quantities become new quantities

Quantity	Ratio of:	Unit of Measure
Speed	Distance/time	
"unit price"	Cost/weight	

Vocabulary

Mathematical Modeling: representing a real-world phenomenon or quantity with an equation or inequality.

Formula: an equation that shows the relationship between two or more quantities.

Examples of formulas you've seen are:

$A_{circle} = \pi r^2$ $\quad V_{box} = L * w * h$

$A_{\text{rectangle}} = L * W$ $\quad A = \frac{1}{2}(b_1 + b_2)h$

Expressions from Phrases

What mathematical expression represents the following?

Three more than twice a number

Five less than three times a number

The width is 4 times the length.

The area of a rectangle whose width is 4 times its length.

Write a mathematical expression that represent each statement:

1. The number of girls is three less than twice the number of boys.

2. The salary after a 4% increase

3. Area of a rectangle whose length is 2 more than twice its width.

4. The area of a rectangle with the same size square cut out of each corner.

Area of a Rectangle

The length of a rectangle is 4 more than 3 times its width.

The area of the rectangle is 200 square inches.

What is the length and width of the rectangle?

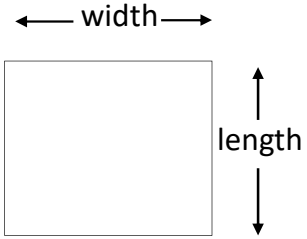
Area = L * W

L = 3W + 4 A = 200

Using substitution:

200 = (3W + 4) * W

Solve by graphing.



Area of a Rectangle

Area = L * W

L = 3W + 4 A = 200

Using substitution:

200 = (3W + 4) * W

Solve by graphing.

Get into "zero equals form"

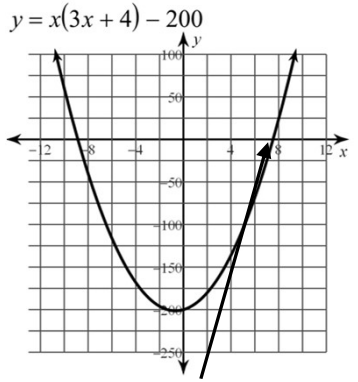
0 = W(3W + 4) – 200

Let 'x' = width

$0 = x(3x+4) - 200$

$y = x(3x+4) - 200$

Find the "zero" of the equation.



Area of a Rectangle

Area = L * W

L = 3W + 4 A = 200

Using substitution:

200 = (3W + 4) * W

$y = x(3x+4) - 200$

Using substitution:

L = 3W + 4

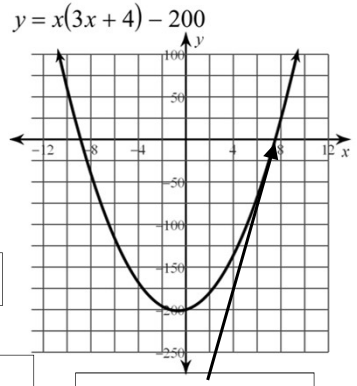
L =

L =

Check:
200 = L*W

Check:
200 = _____

Find the "zero" of the equation.



w =

Area of a Rectangle

The length of a rectangle is 7 less than 4 times its width.

The area of the rectangle is 6600 square inches.

What is the length and width of the rectangle?

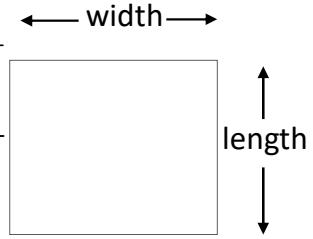
Area = _____ * _____

L = _____ A = _____

Using substitution:

_____ = (_____) * _____

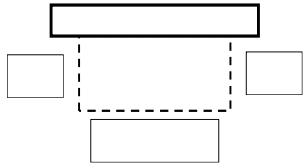
Solve by graphing.



Area of a Rectangle

200 feet of fence is used to build a rectangular horse corral. One side of the corral is next to a large barn and does not need to be fence.

a) Draw a top-view picture of the corral and barn.

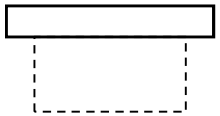


b) Label the length of each side of a fenced corral using only one variable.

c) Using the rectangle area formula, write an equation that has only one variable.

$A(x) =$ _____

d) What are the x-intercepts?



e) What is the vertex?

f) Hand-draw a graph of the equation with the axes correctly labeled.

g) Graph the equation on your calculator, and find the vertex using "2nd" + "calc" + "maximum"