Math-2

Lesson 6-5

Review:

- Modeling with Quadratic Equations
- Linear Modeling
- Factoring Quadratic Equations whose lead coefficient is not ‘1’
- Analyzing Functions

Area of a Rectangle

$\boxed{\text{Area} = L * W}$

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

$L = 3W + 4$

The area of the rectangle is 200 square inches. $A = 200$

What is the length and width of the rectangle?

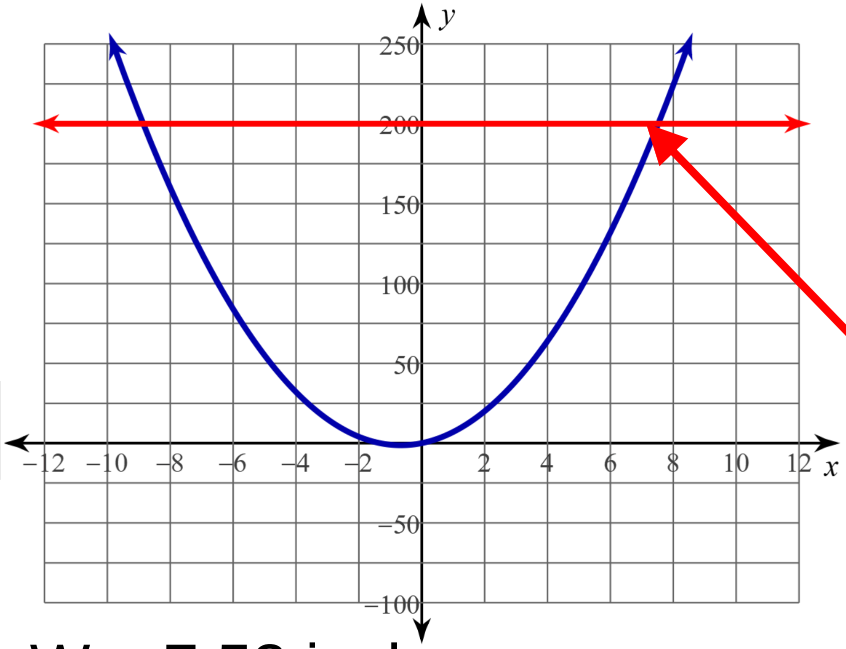
Using substitution:

$A = (3W + 4) * W$

$A = 200$

$\boxed{\text{Let: } y = A \text{ and } x = W}$

Solve by graphing.



(7.53, 200)

Check:

$200 = (26.59)(7.53)$

$W = 7.53$ inches

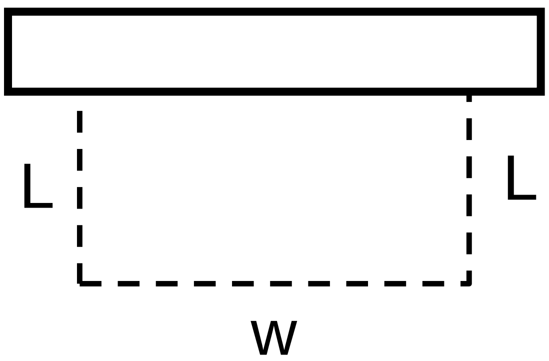
$L = 3(7.53) + 4 = 26.59$ in

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.

$200 = 2L + w$ $\qquad$ $w = 200 - 2L$

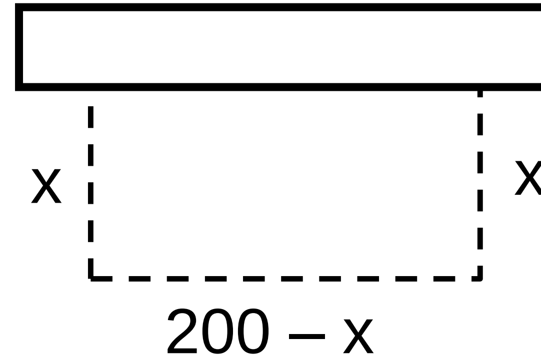
c) Write the area formula for this problem.

$$A(L) = L(200 - L)$$

Let: $y = A(L)$ and $x = L$

d) Find the maximum possible area for the corral.

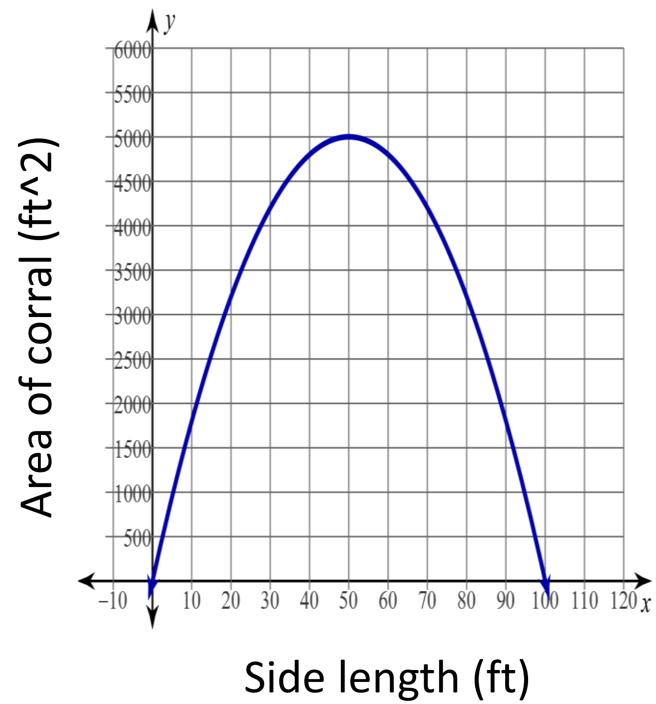
e) What are the x-intercepts?



$$A(x) = x(200 - x)$$

$$(0, 0)\ and\ (200, 0)$$

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"

$$(50, 5000)$$

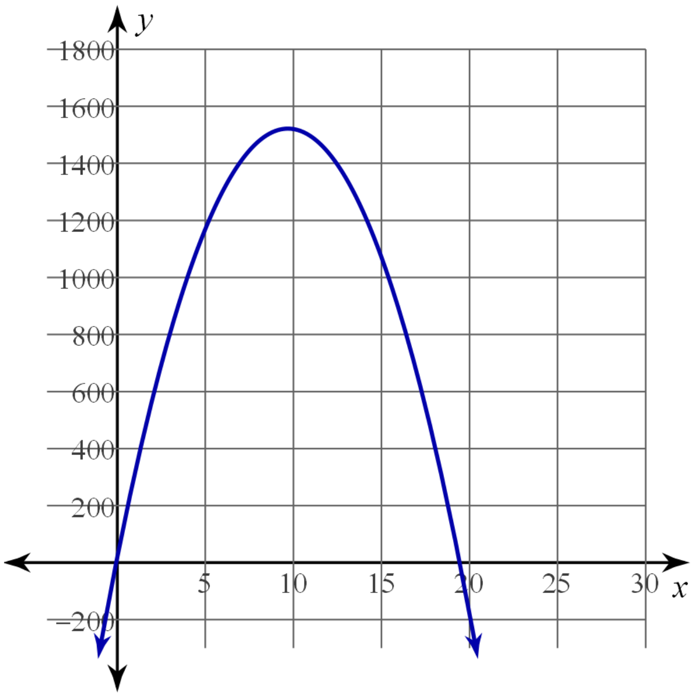
h) Interpret what the vertex means for this problem.

When L = 50 ft (and w = 100 ft), the corral area will be a maximum (of 5000 square feet)

An object is launched vertically upward from the top of a 20 foot building at an initial velocity of 310 ft. per second.

$$h(t) = -16t^2 + V_0 t + h_0$$

$$h(t) = -16t^2 + 310t + 20$$



a) Find the maximum height
b) Find the time it takes to reach maximum height
c) Find the time when it falls to the ground.

a) 1521.6 ft
b) 9.7 sec
c) 19.4 sec

An object is launched vertically upward from the ground at an initial velocity of 200 ft per second.

$$h(t) = -16t^2 + V_0 t + h_0$$

During what period of time with the object be above 500 feet?

$$h(t) = -16t^2 + 200t$$

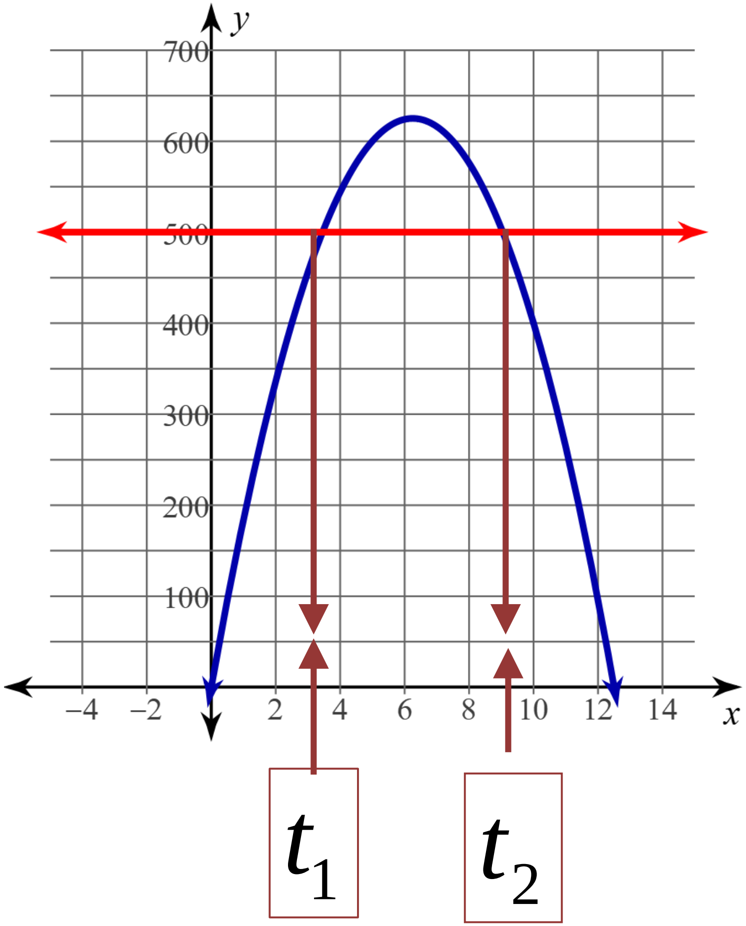
$$h(t) = 500$$

Find the (time, height) pairs → points of intersection.

$$(t, h)$$

$$(3.5, 500)\ and\ (9.1, 500)$$

Time (sec) = $(3.5, 9.1)$



Multiply 1st times Last

$$3x^2 + 14x + 8$$

$$3 * 8 = 24$$

$$2 + 12 = 14$$

Other factors of 24 that add up to 14?

$$24 = 2 * 12$$

This tells us to break 14x into 2x + 12x

$$3x^2 + 14x + 8$$

$$3x^2 + 2x + 12x + 8$$

These are all of the terms in "the box"

	x	4
3x	$3x^2$	12x
2	2x	8

$$3x^2 + 14x + 8$$

Factored form:

$$\rightarrow (3x + 2)(x + 4)$$

Factor

9*10 = ____

$$9x^2 - 13x - 10$$

____*____= ____

____+____= -13

12*5 = ____

$$12x^2 - 16x + 5$$

____*____= ____

____+____= -16

A car rental company charges: $60 per day plus $0.75 per mile

You decide the rent the car for a day. Fill in the remainder of the table.

Write the equation that predicts the cost of renting the car based upon how many miles are driven.

$$C_A(m) = 0.75m + 60$$

"m" miles	Total Cost
0	
50	
100	
150	
200	
250	
300	

How much would your bill be if you drove the car 525 miles?

Analyzing the graph

1. Where is the function increasing?
2. Where is the function decreasing?
3. Where is the function positive?
4. Is the function even/odd or neither?
5. Are there any "extrema"? If so, what type are they?
6. How does it relate to its "parent function"?
7. What is the "end behavior" of the graph?

$$\text{as } x \to -\infty,\ y \to ? \qquad \text{as } x \to +\infty,\ y \to ?$$

8. What is the "domain" of the graph?
9. What is the "range" of the graph?
10. What is the "average rate of change" between two given values of 'x'?

Analyze the function.