

MA 150 Quadratics Quiz Review

Name _____

#1 and 2: Identify the following features and graph. Show all work supporting your answers.

1. $y = x^2 + 8x + 12$

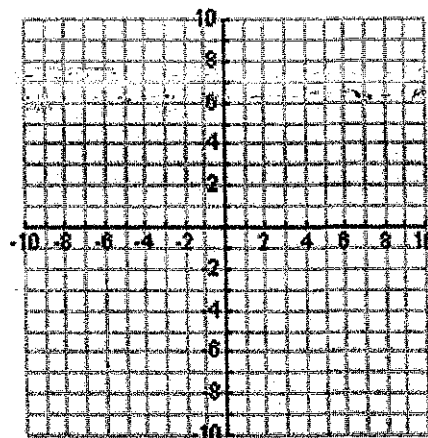
Vertex Form:

Vertex:

x-int(s):

y-int:

Axis of Symmetry:



2. $y = x^2 + 4x$

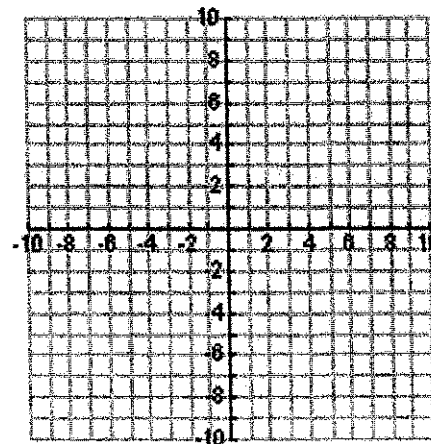
Vertex Form:

Vertex:

x-int(s):

y-int:

Axis of Symmetry:



#3 Convert to vertex form:

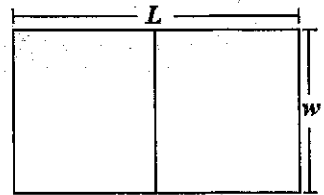
a. $y = x^2 - 8x + 15$

b. $y = 4x^2 + 16x - 3$

$y =$ _____

$y =$ _____

4. A builder is creating two side-by-side paddocks and has 1200 feet of fencing. Given the diagram to the right, the combined area of the two paddocks is $A = -1.5w^2 + 600w$



What value of w will maximize the area?

$w =$ _____

What is this maximum area?

Area = _____

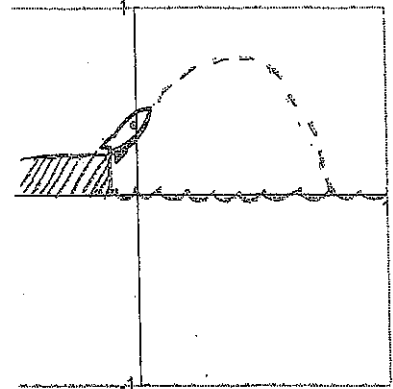
5. A quadratic equation goes through the points $(2, 9)$, $(4, -13)$ and $(-6, -63)$. What is the quadratic equation?

$y =$ _____

Model Rocket Problem

A grid is superimposed on a diagram showing the motion of a model rocket after it has been shot off from a dock on the shore of a lake.

Let x = the number of seconds since the rocket has taken off
Let y = the height of the rocket

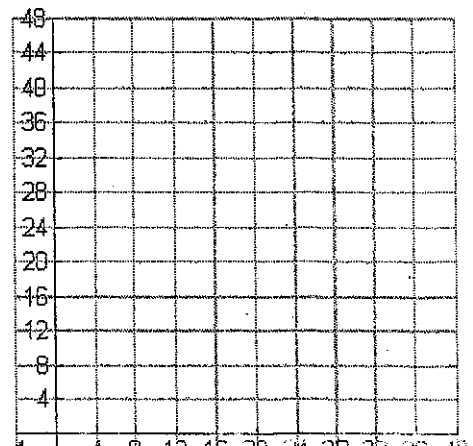


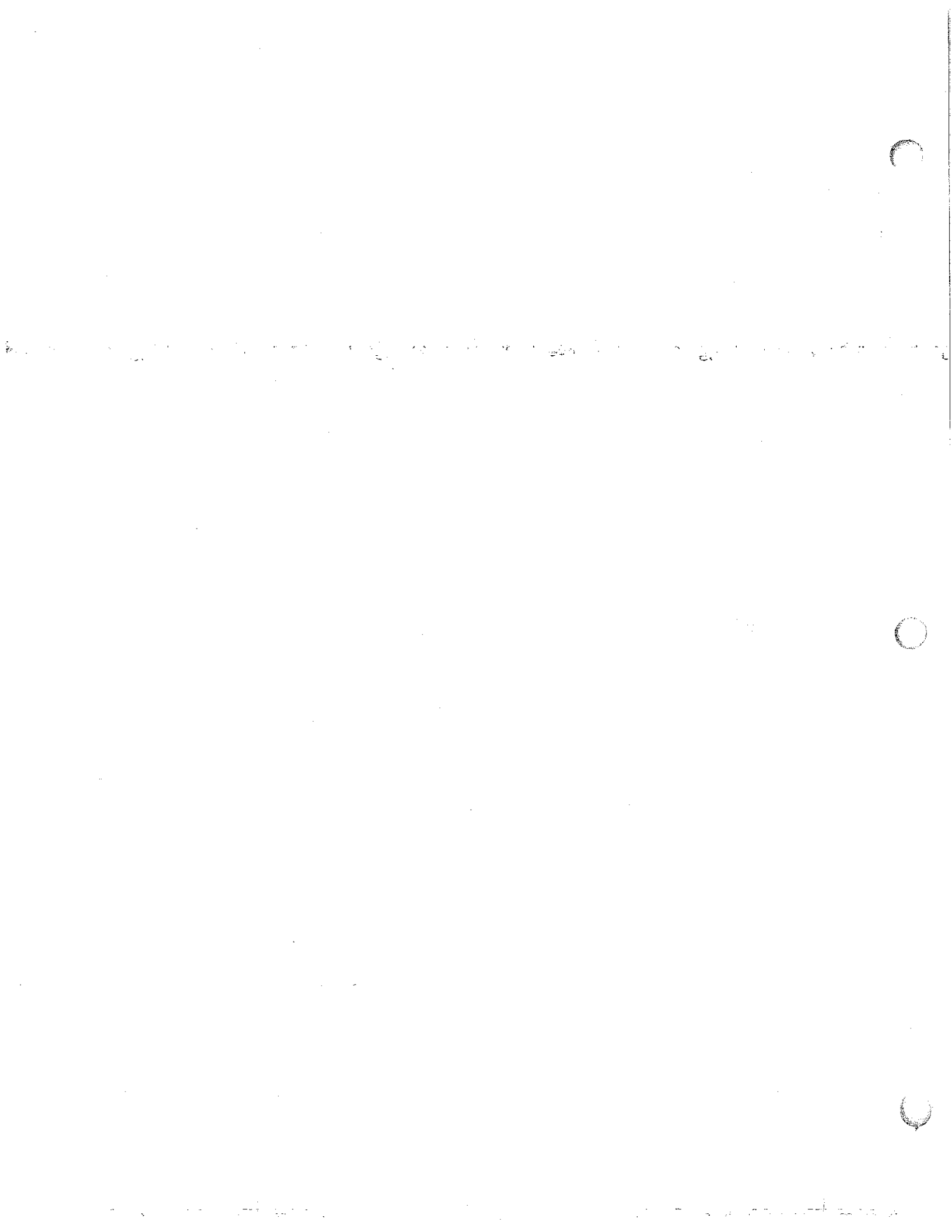
The equation that describes the motion of the submarine $y = -0.125x^2 + 4x + 12$

- Find the initial height of the rocket
- The rocket will eventually reach its maximum height. When will it reach this highest point?
- What is the maximum height the rocket will climb to?
- Find the time when the rocket will hit the water.

e. Using what you found in a – d, plot the motion of the rocket including x-intercept, y-intercept, and vertex.

f. Write, in interval notation, a reasonable domain for this problem.





MA 150 Quadratics Quiz Review

Name Key

#1 and 2: Identify the following features and graph. Show all work supporting your answers.

1. $y = x^2 + 8x + 12$

Vertex Form:

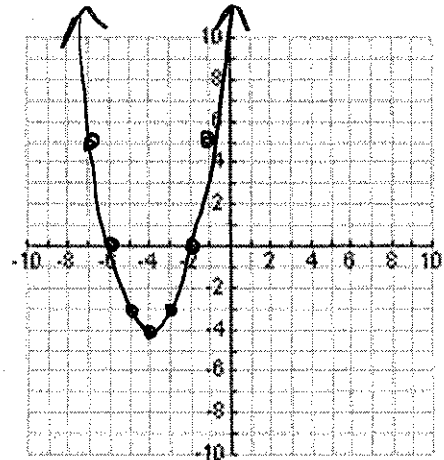
$$y = x^2 + 8x + \underline{16} + 12 - \underline{16}$$

Vertex:

$$y = (x+4)^2 - 4 \quad (-4, -4)$$

x-int(s): $0 = (x+6)(x+2) \quad x = -2, -6$

y-int: 12



Axis of Symmetry: $x = -4$

2. $y = x^2 + 4x$

Vertex Form:

$$x^2 + 4x + \underline{4} - 4$$

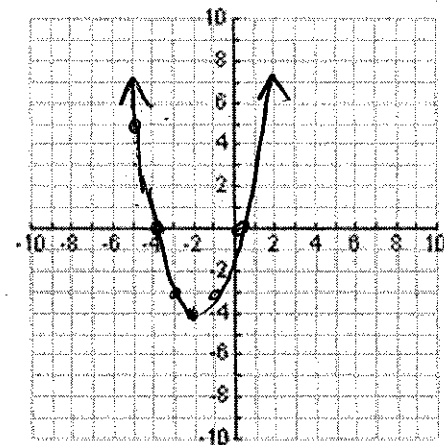
Vertex:

$$(x+2)^2 - 4$$

$$(-2, -4)$$

x-int(s): $0 = x(x+4) \quad 0, -4$

y-int: 0



Axis of Symmetry:

$$x = -2$$

#3 Convert to vertex form:

a. $y = x^2 - 8x + 15$

$$x^2 - 8x + 16 + 15 - 16$$

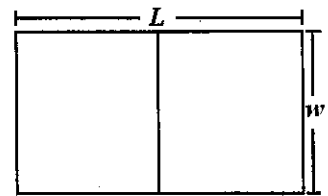
$$y = \underline{(x-4)^2 - 1}$$

b. $y = 4x^2 + 16x - 3$

$$4(x^2 + 4x + 4) - 3 - 16$$

$$y = \underline{4(x+2)^2 - 19}$$

4. A builder is creating two side-by-side paddocks and has 1200 feet of fencing. Given the diagram to the right, the combined area of the two paddocks is $A = -1.5w^2 + 600w$



What value of w will maximize the area?

$$\frac{-600}{2(-1.5)} = \frac{-600}{-3} = 200$$

$$w = \underline{200}$$

What is this maximum area?

$$-1.5(200)^2 + 600(200)$$

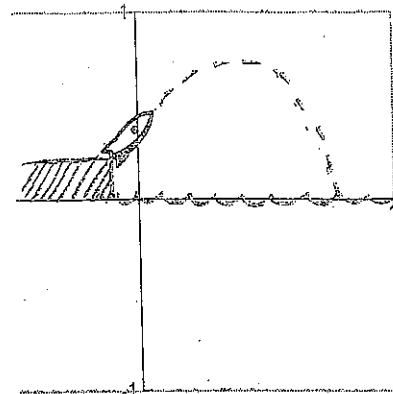
$$\text{Area} = \underline{60,000}$$

5. A quadratic equation goes through the points $(2, 9)$, $(4, -13)$ and $(-6, -63)$. What is the quadratic equation?

$$y = \underline{-2x^2 + x + 15}$$

Model Rocket Problem

A grid is superimposed on a diagram showing the motion of a model rocket after it has been shot off from a dock on the shore of a lake.



Let x = the number of seconds since the rocket has taken off
 Let y = the height of the rocket

The equation that describes the motion of the submarine $y = -.125x^2 + 4x + 12$

- a. Find the initial height of the rocket

12

- b. The rocket will eventually reach its maximum height. When will it reach this highest point?

$$x = \frac{-b}{2a} = \frac{-4}{2(-.125)} = \frac{-4}{-.25} = 16$$

X-coord of vertex

(16, 44)

- c. What is the maximum height the rocket will climb to?

Y-coord of vertex

$$y = -.125(16)^2 + 4(16) + 12 = 44$$

- d. Find the time when the rocket will hit the water.

$$\begin{aligned} -44 &= \frac{-.125(x-16)^2}{-.125} & 0 &= -.125x^2 + 4x + 12 \\ & & &= -.125(x^2 - 32x + 256) + 12 + 32 \\ 352 &= (x-16)^2 & 0 &= -.125(x-16)^2 + 44 \\ x &= \pm \sqrt{352} + 16 = \boxed{34.8} - 2.96 \end{aligned}$$

- e. Using what you found in a - d, plot the motion of the rocket including x-intercept, y-intercept, and vertex.

f. Write, in interval notation, a reasonable domain for this problem. $[0, 34.8]$

