

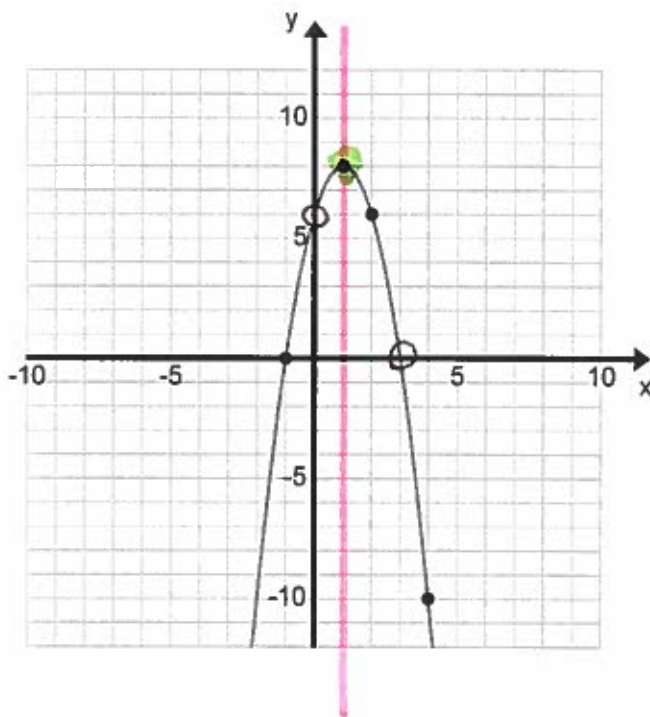
Math 20-2
Quadratic Functions Quiz

Name: _____

1. Given the graph of the function:

- Write the coordinates of the vertex.
- Sketch in the axis of symmetry and write the equation for the axis of symmetry.
- Find the x - intercepts.
- Find the y - intercept.
- Write the domain and range.

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Vertex (1, 8)

Symmetry $x = 1$

x-intercepts
(-1, 0) and (3, 0)

y-intercept
(0, 6)

Domain: $x \in \mathbb{R}$

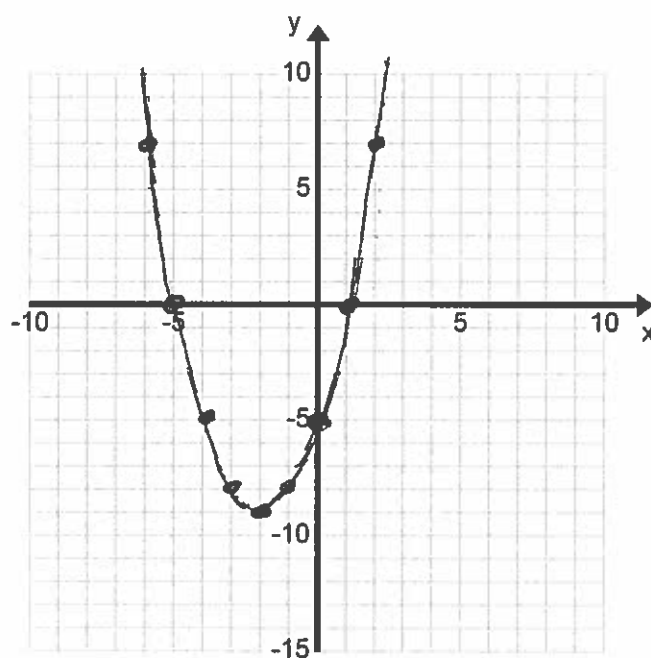
Range: max y-value is 8
 $y \leq 8$

2. Given the equation of the quadratic function:

- find points to plot using an algebraic method and/or a calculator skills
- find the x - intercepts
- find the y - intercept
- find the vertex
- write the equation for the axis of symmetry
- write the domain and range

$$y = x^2 + 4x - 5$$

X	Y
-6	7
-5	0
-4	-5
-3	-8
-2	-9
-1	-8
0	-5
1	0
2	7



3

x-intercepts
(-5, 0) and (1, 0)

y-intercept
(0, -5)

vertex
(-2, -9)

symmetry
 $x = -2$

Domain: $x \in \mathbb{R}$

Range: $y \geq -9$

3. Use Quadratic Regression to find the quadratic equation and draw the graph for the following:

X	Y
-3	7
-2	0
2	-8
4	0
5	7

Identify the parameters:

$$y = ax^2 + bx + c$$

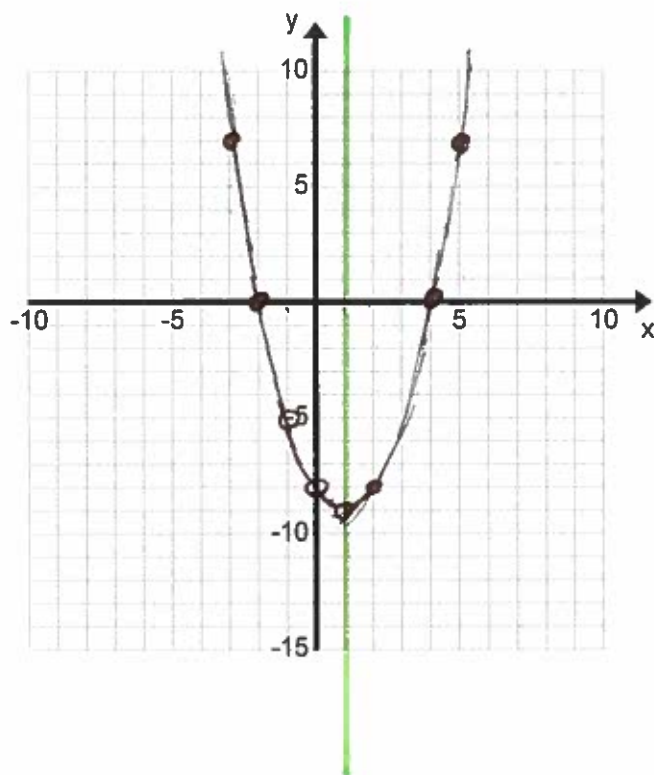
$$a = 1$$

$$b = -2$$

$$c = -8$$

Write the equation:

$$y = x^2 - 2x - 8$$



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4. A hockey arena has 3000 seats. When the price of a ticket is \$20, all seats are sold for every game. The manager needs to increase the revenue from the sale of tickets, so she commissions a survey to predict ticket sales for different ticket prices. The results are shown in the table below.

Ticket Price	\$ 20.00	\$ 25.00	\$ 55.00	\$ 60.00	\$ 75.00
Expected Sales	3000	2800	1600	1400	800

- a) Find the revenue generated for each ticket price.

Ticket Price	\$ 20.00	\$ 25.00	\$ 55.00	\$ 60.00	\$ 75.00
Revenue	60 000	70 000	88 000	84 000	60 000

- b) Determine a **quadratic regression** equation that could be used to best-fit the data. Round off your values to the nearest hundredth as necessary.

$$y = ax^2 + bx + c$$

$$a = -40$$

$$b = 3800$$

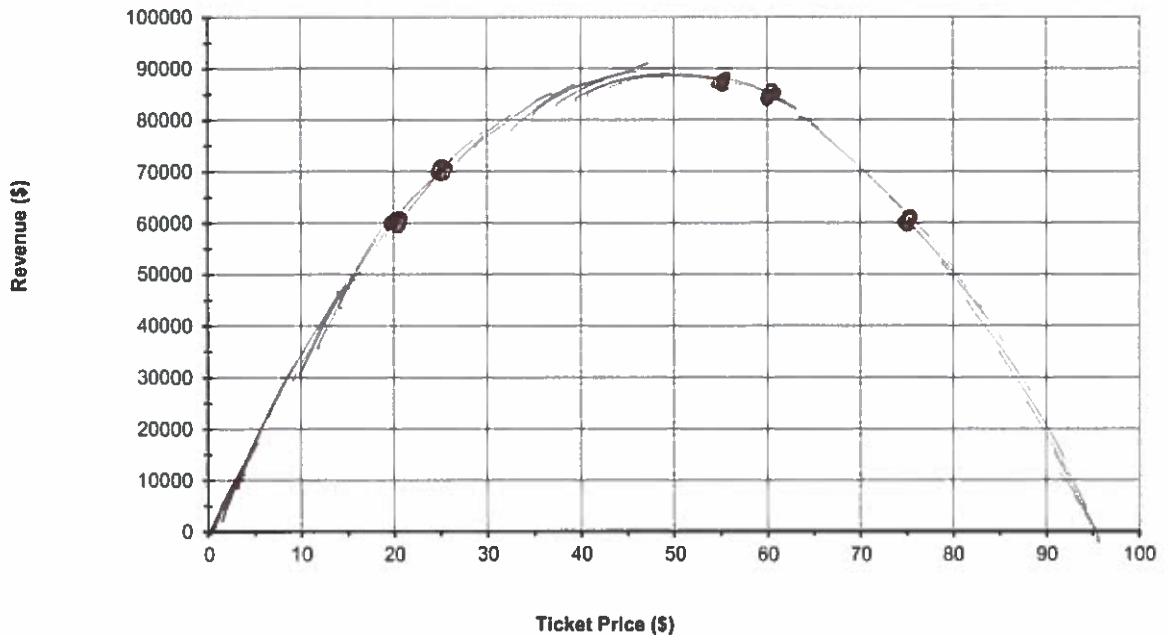
$$c = 0$$

$$y = -40x^2 + 3800x + 0$$

- c) Use the scales on each axis to set a window for your calculator. Draw a graph to illustrate the expected revenue for different ticket prices.

Hockey Revenue

$$y = -40x^2 + 3800x$$



- d) What ticket prices will generate revenue of \$86,000?

$$y_2 = 86000 \quad \text{intersect}$$

$$(37.19, 86000) \quad (57.81, 86000)$$

- PRICES: \$37.19 and \$57.81 generate \$86,000.
- e) What ticket price will generate the maximum revenue?

$$\text{MAX } x = 47.50 \quad y = 90250$$

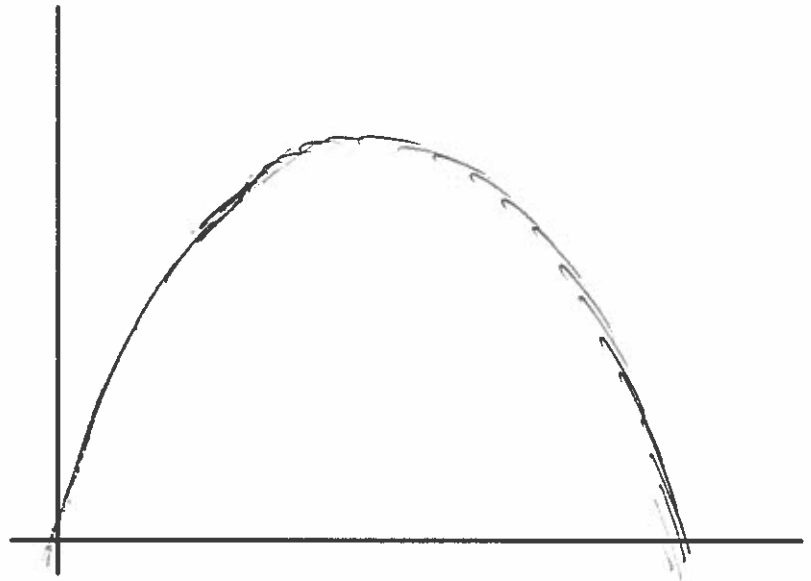
$$\text{PRICES: } \$47.50$$

5. A soccer player kicks the ball towards the goal. The height of the ball is given by the equation: $h = -0.3t^2 + 1.9t$, where t is the time in seconds and h is the height of the ball in metres.

a) Sketch the path of the ball using the window:

$$X: [-2, 8, 1]$$

$$Y: [-1, 6, 1]$$



b) Find the maximum height of the ball. $x = 3.167$ $y = 3.008$

Max Height is 3.0m

c) Find how long the ball is in the air. $x = 6.33$ $y = 0$

Time in air: 6.3 s

e) Find when the ball first has a height of 2.0 metres.

$$x = 1.33 \quad y = 2$$

$$x = 5 \quad y = 2$$

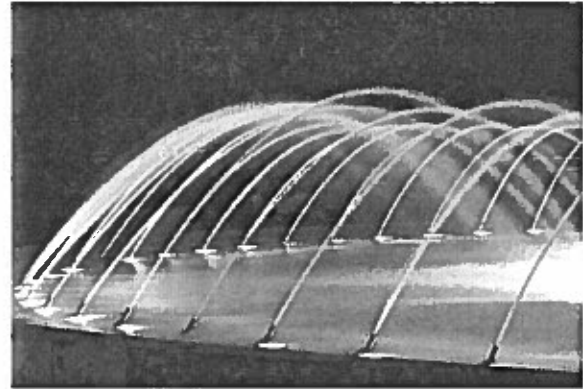
FIRST: time is 1.3 s

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6. At a fountain the path of water from one of the jets can be defined by the function: $f(x) = -0.25x^2 + 10x$.

x = horizontal distance from the opening in the ground in feet

$f(x)$ = height of the spray water in feet.

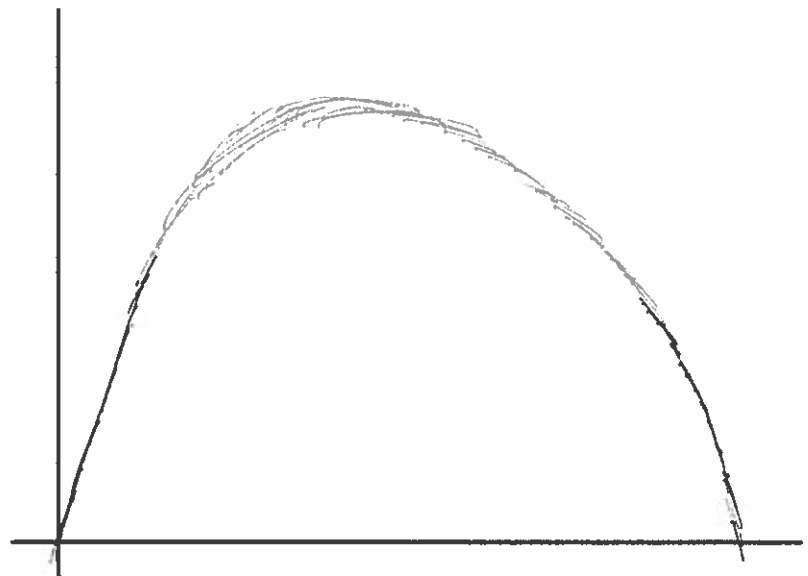


- a) Find a window that will allow you to see the path of the water. (Quadrant one is where you want to see the water.)

$$X: [\text{min, max, scale}] = [\underline{-5}, \underline{50}, \underline{5}]$$

$$Y: [\text{min, max, scale}] = [\underline{-15}, \underline{150}, \underline{25}]$$

- b) Draw a sketch of the water path using your window.



- c) What is the maximum height of the arch of water?

$$x=20 \quad y=100$$

Max height is 100 ft

- d) How far from the opening in the ground can the water reach?

$$x=40 \quad y=0$$

water goes 40 ft.

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