Math 20-2
Objectives:

- Solve quadratic equation problems when given a function.
- Solve quadratic equation problems when you find your own equation using Regressions.

1. The equation of a pop bottle rocket in flight is given by $h(t) = -5.0t^2 + 20t + 1.0$, where h is the height of the rocket in meters and t is the time in seconds.

Graph: $y_1 = -5.0x^2 + 20x + 1.0$

Set up a good window to view the flight path. Sketch the flight path.

Window: [min, max, scale]

X: [_____, _____, _____]

Y: [_____, _____, _____]

Determine:

a) The maximum height.

b) Height at 4 seconds.

c) Start height

d) Time spent in air

e) When is the pop bottle at a height of 2 m? $[y_2 = 2, intersect]$

2. A hockey arena has 2400 seats. When the price of a ticket is $10, 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	10	25	35	50
Expected Sales	2400	1750	1220	410

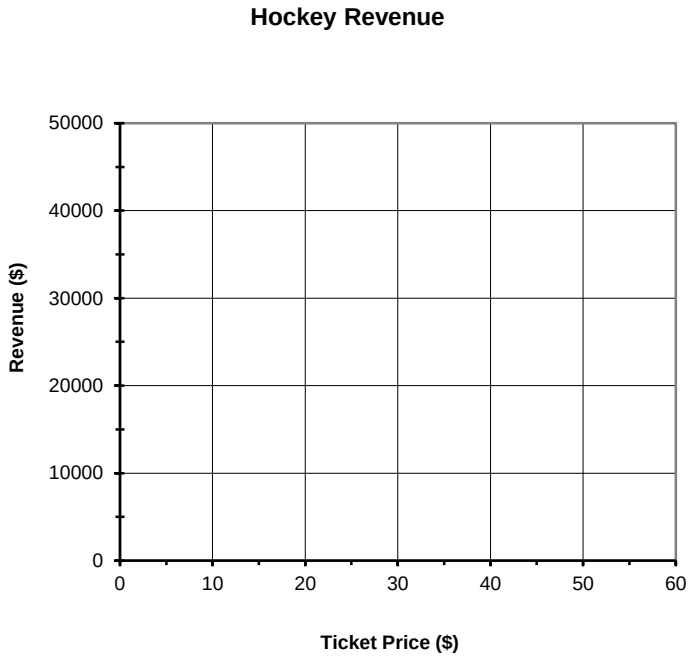
a) Find the revenue generated for each ticket price. Plot the Price and Revenue as points and sketch the function to illustrate the expected revenue for different ticket prices.

Ticket Price	10	25	35	50
Revenue				

b) Find the Revenue Equation.

Find the "Quad Regression" using Ticket Price and Revenue for your lists. Round off your values to nearest hundredth as necessary.

c) Use the scales on each axis to set a window for your calculator. Graph the function on your calculator and compare to your hand sketch.



d) What ticket prices will generate revenue of $30000?

Ex. 3 The trajectory of a paper airplane is given by $h(t) = -2.0t^2 + 5.0t + 3.0$, where h is the height of the plane in meters, and t is the time in seconds. Set up a good window to view the flight path. Sketch the flight path. Determine:

Window: [min, max, scale]

X: [_____, _____, _____]

Y: [_____, _____, _____]

a) The maximum height

b) The height of the plane at 2sec

c) How long before it lands

d) Height at "take off"

e) How long does it take to reach 1.5 m?

Ex. 4 A company sells canoes for $500.00 each. At this price it can sell 60 canoes generating a revenue of $30 000. To increase revenue management has decided to increase the selling price. Management estimates that for every $50 increase in price canoe sales will drop by 4.

a) Complete the following table.

Price per Canoe ($)	$500	$550	$600	$650
Canoes Sold	60			
Revenue	=500*60 = 30 000			

b) Determine the quadratic regression of **price** per canoe and the **revenue**.

(L1 = price, L2 = revenue)

c) Set a window and sketch the

Window: [min, max, scale]
X: [_____, _____, _____]
Y: [_____, _____, _____]

d) What is the selling price for maximum revenue, and what is that revenue?

Practice Questions

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