Chapter 4 Linear & Quadratic Functions

Sections:

4.1 Linear Functions

Video 1:

Graph the functions using the slope and y-intercept:

a) $f(x) = 3x - 4$
b) $f(x) = 3x - 4$
c) $G(x) = -2$

Are the functions increasing, decreasing, or constant?

Video 2:

Is the function linear or nonlinear?

a)

X	F(x)
-2	-7
-1	0
0	1
1	2
2	9

b)

x	F(x)
-2	-7
-1	-5
0	-3
1	-1
2	1

Video 3:

Find the following using the two given functions:

a) $f(x) = -2x + 10$
b) $g(x) = 3x + 7$

Determine when $f(x) = 0$, $g(x) < 0$, $fx = g(x)$, $f(x) \le g(x)$

Video 4:

A store can sell 480 shirts per week at a price of $10 each, but can only sell 400 shirts per week at a price of $12 each.

    a) Find a linear equation that models the number of shirts demanded per week at price p.
    b) How many shirts would be sold at price of $15 per week?

4.2 Graphing Quadratic Functions

Video 1:

Graph:

    a) $f(x) = \dfrac{1}{2}x^2$

    b) $f(x) = (x-2)^2 - 3$

Video 2:

Graph the following functions:

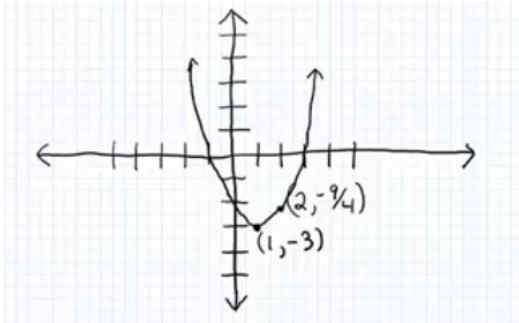   a) $f(x) = x^2 - 5x - 3$

    b) $f(x) = 3x^2 + 4x - 2$

Video 3:

Graph the following function: $f(x) = \dfrac{1}{2}x^2 - 3x - 1$

    a) Find the vertex
    b) Axis of symmetry
    c) Intercepts
    d) Domain and range
    e) Where it increases and decreases

Video 4:

Determine the function that has the following graph:

Video 5:

Does the following function have a maximum or a minimum? Find the value: $f(x) = 3x^2 - 4x + 2$

4.3 Quadratic Models

Video 1:

The price p (in dollars) and the amount of a product that is sold (x) follow the demand function: $x = -18p + 1000$ where $0 < p < 55$

a) Express revenue, R, as a function of x
b) What is the revenue if 300 units are sold?
c) What quantity, x, maximizes the revenue?
d) What is the max revenue?
e) What price should be charged to maximize revenue?
f) What price should be charged to earn at least $4,000?

Video 2:

A missile is fired from a seaside cliff 300ft above sea level at a 45° incline and muzzle velocity of 75 ft per second. The height of the missile above the water is modelled by: $h(x) = \dfrac{-32x^2}{(75)^2} + x + 300$
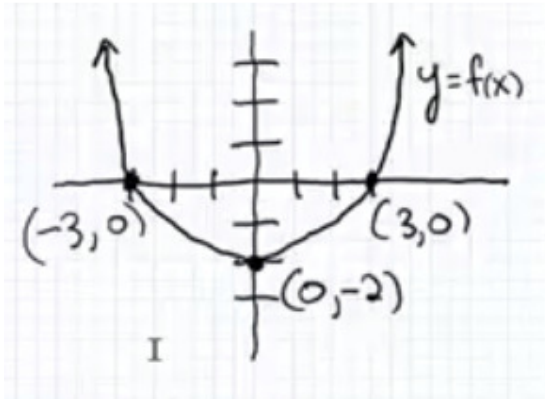
where x= the horizontal distance from the cliff face

a) At what horizontal distance from the cliff is the missile at its maximum height?
b) Find the maximum height
c) When the missile is 50 ft above sea level, how far is it from the cliff?

4.4 Solving Quadratic Inequalities

Video 1:

Use the graph to solve the inequalities:

a) $f(x) > 0$
b) $f(x) \le 0$

Video 2:

Solve the inequalities:

a) $x^2 - 8x + 7 < 0$
b) $x^2 + 5x + 7 > 0$

Video 3:

Solve the inequalities:

a) $x^2 - 4 < 0$
b) $3x^2 < 10x - 8$

Video 4:

Solve the inequalities:

a) $x^2 + 2x + 3 > 0$
b) $x^2 - x + 2 \le 0$

Video 5:

Solve the inequalities:

    a) $5(x^2 - 1) - 4 \geq 4x$

    b) $4x^2 + 1 > 4x$

Video 6:

A ball is throw straight into the air with an initial velocity of 80 feet per second. The distance in feet(s) of the ball from the ground after t seconds is s(t).

$$S(t) = 80t - 16t^2$$

    a)   How many seconds will it take for the ball to strike the ground?

    b)   When will the ball be more than 90ft above ground?