Linear Functions Video Lecture

Section 8.1

Course Learning Objective:

1) Graph linear equations and model applications based on these equations and their graphs.
2) Demonstrate appropriate manipulation of function notation and be able to find the domain and range of a function.

Weekly Learning Objectives:

1) Graph linear functions.

2) Write an equation of a line using function notation.

3) Find equations of parallel and perpendicular lines.

4) Evaluate a function from its graph or formula.

5) Find the domain and range of a function from its graph or formula.

6) Interpret slopes and intercepts in linear function applications.

7) Find a linear function that models an application and make predictions using the linear function.

Linear Functions

By the vertical line test, we know that every line is a function, except for vertical lines.
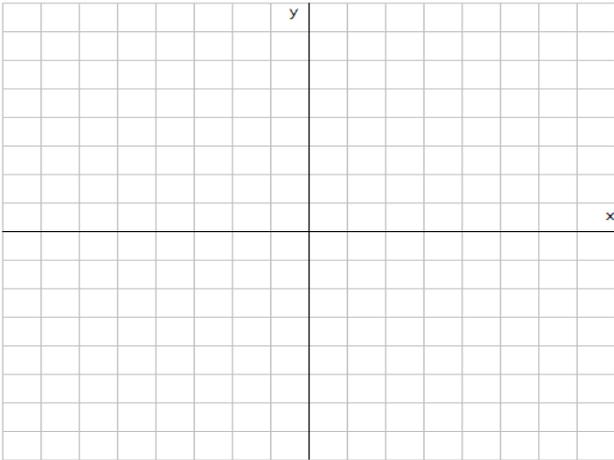For example,

y = 2x+1   y = 3   x = -1

Recall **Slope-Intercept Form: y = mx + b**

If we swap y with f(x), then this becomes **Function Form: f(x) = mx + b**

Graph the function f(x) = -3x+4

Find the equation of the line with slope = -2 and y-intercept (0,5). Put the line in function form.

Find the equation of the line in function form that goes through (1,-2) and (2,-3).

Find the equation of the line in function form that has an x-intercept of 4 and a y-intercept of -3.

Find the equation of the line perpendicular to the y-axis that goes through (3,-1).

Find the equation of the line containing (8,-3) that is parallel to the line 3x+4y=1. Write the equation in standard form.

Find the equation of the line containing (8,-3) that is perpendicular to 3x+4y = 1. Write the equation in function form.

Find the domain and range of the function f(x) = -3x+2.

Given the graph of f(x) below, find the following:

f(x)
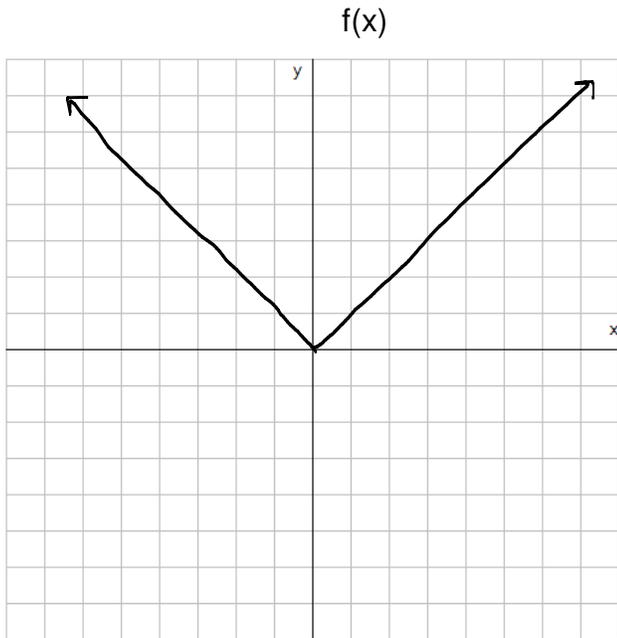
a) f(0)   b) f(2)   c) f(-4)

d) Domain of f(x) =

e) Range of f(x) =

f) Find all x-values such that f(x) = 1

The annual average income of an American woman with a bachelor's degree is given by the function:
$$f(x) = 4174.9x + 42173$$
where x is the number of years after 1999.

a) Find the average income of an American woman with a bachelor's degree in 2000.

b) Find and interpret the slope of the function.

c) Find and interpret the y-intercept of the function.

The number of people employed in the U.S. as registered nurses was 2284 thousand in 2002. By 2012, this number is expected to rise to 2908 thousand. Let N(t) be the number of registered nurses (in thousands) employed in the U.S. in the year t, where t = 0 represents 2002.

a) Write a linear function that models the number of people (in thousands) employed as registered nurses in the year t.

b) Use this model function to estimate the number of people who will be employed as registered nurses in 2010.