

# MATH 1311

Section 3.2

# Linear Functions

Linear Functions always pay special attention to two main elements:

The rate of change.

The initial value.

# Linear Functions

Linear Functions always pay special attention to two main elements:

The rate of change → Slope

The initial value → Y-Intercept

Linear Functions will be in the form of:  $f(x) = (\text{Slope})x + (\text{Y-Intercept})$   
or  $f(x) = mx + b$

## Example:

A car rental company models its daily price structure based on a linear function. There is a flat fee of \$150 with an additional charge of \$0.05 per mile driven. Write an equation for the daily price structure.

- a. Determine the rate of change.
  
- b. Determine the initial value.
  
- c. Create a linear equation.

# Example:

It costs \$250 to buy materials to make bird houses. You can sell each birdhouse of \$15. Create the linear equation for profit.

- a. Identify the rate of change and the initial value.
- b. Write your linear function.
- c. Determine the value of the x-intercept. What does this value mean?
- d. Determine the value at  $x = 200$ . What does this value mean?

# Linear Equations from Data:

A hotel company charges guests based on a linear function. A guest staying 3 nights will pay \$450 and a guest staying 6 nights will pay \$750.

- a. Write the two pieces of data as coordinate points.
- b. Determine the slope of the linear function.
- c. Determine the y-intercept of the linear function.
- d. Write the linear function.
- e. Determine how much a guest staying 8 nights will have to pay.

The amount of property tax a person pays is a linear model based on the square footage of their home. A home of 2500 sq ft will pay \$1500 annually and a home of 3000 sq ft will pay \$1600.

1. Determine the slope of the linear function.
2. Determine the  $y$ -intercept of the linear function.
3. Determine the equation of the linear function.
4. How much tax would a home of 5000 sq ft need to pay?