

Name: \_\_\_\_\_

Key

Date: \_\_\_\_\_

Class: \_\_\_\_\_



# pulling it all together 4.4

Throughout this unit, you have learned several ways to model linear relationships. You have also learned ways to move back and forth between tables, graphs, and equations to solve problems. The next problem pulls some of these ideas together.

Today is Chantal's birthday. Her grandfather gave her some money as a birthday gift. Chantal plans to put her birthday money in a safe place and add part of her allowance to it each week. Her sister, Chanice, wants to know how much their grandfather gave her and how much of her allowance she is planning to save each week. As usual, Chantal does not answer her sister directly. Instead, she wants her to figure out the answer for herself.

After five weeks, I will have saved a total of \$175

After eight weeks, I will have saved \$190.

1. How much of her allowance is Chantal planning to save each week?

\$5 per week  
(\$15 per 3 weeks)

2. How much birthday money did Chantal's grandfather give her?

\$150

3. Write an equation for the total amount of money,  $A$ , Chantal will have saved after  $n$  weeks. What information do the  $y$ -intercept and slope represent in this context?

$$A = \$5n + 150 \quad \text{or} \quad A = 150 + 5n$$

Malcolm is taking a bike repair class. The class costs \$120 total. He pays the bike shop \$15 per week for the class.

1. Write an equation that models the relationship between the time in weeks and the amount of money Malcolm owes.

$$y = -15x + 120 \quad \text{or} \quad y = 120 - 15x$$

2. After three weeks, how much does Malcolm still owe?

\$75

3. How many weeks will it take Malcolm to completely pay off the bike repair class?

8 weeks

4. Without graphing, describe what the graph of this relationship would look like. Is it increasing or decreasing? Where does the line cross the  $y$ -axis?

Decreasing (-15 per week) & crosses  $y$ -axis at 120

Esmeralda need to rent a moving truck in a few weeks, and she is looking at two different companies to decide which will give her the best deal. Company 1 charges \$5 per mile, plus mandatory insurance for \$20. Company 2's charges are represented in the table below.

Miles (x)	10	15	20	25
Cost (y)	85	120	155	190

1. Who charges more per mile (in other words, who has a greater rate of change)? How do you know?

Company 2 \$7/mile versus \$5/mile

2. Who charges more for insurance (in other words, who has a greater y-intercept)? How do you know?

Company 1 (\$20 versus \$12)

3. If Esmeralda knows she will only be driving the moving truck 25 miles, which company offers a better deal?

Company 1 ( $y = 5x + 20$ )      Company 2  
 $y = 5(15) + 20$       (\$120)  
 $y = 95$

Ky'Anna wants to rent a bike to ride one Saturday. It costs \$12 per hour to rent the bike, plus there is a \$20 cleaning fee added on to the total cost. Answer the following questions based on this situation.

1. What is the independent variable in this situation? What is the dependent variable?

↓  
x (hours)

↓  
(y) cost \$

2. Create a table that models the total cost of renting a bike for 2 hours, 4 hours, 5 hours, and 8 hours.

x	y
2	\$44
4	\$68
5	\$80
8	\$116

3. Write the equation in slope-intercept form that represents the scenario above.

$$y = \$12x + 20$$

4. Using your equation, determine how much it would cost to rent a bike for 9 hours.

$$y = 12(9) + 20$$

$$y = 128$$