

Name: _____

Date: _____

Modeling with Linear Functions Algebra 1

We have learned that slope is used to describe real life rates of change. We also know that the y -intercept is where the line begins on the y -axis. The y -intercept always occurs where the independent variable has a value of zero. Using these two quantities, slope and y -intercept, we can model and solve many real life problems.

Exercise #1: The Arlington Freshmen class wants to have a fundraiser. The class wants to buy a number of \$4 flip-flops and \$5 bracelets. The class has a total of \$100 to spend.

(a) If x represents the number of flip-flops and y represents the number of bracelets, complete the table below.

# of flip-flops, x	0	
# of bracelets, y		0

(b) Using the two points from part (a), write a linear equation in $y = mx + b$ form that gives the number of bracelets that can be bought as a function of the number of flip-flops bought.

(c) Using your equation from (b), determine the number of bracelets that can be bought if 10 flip-flops were purchased.

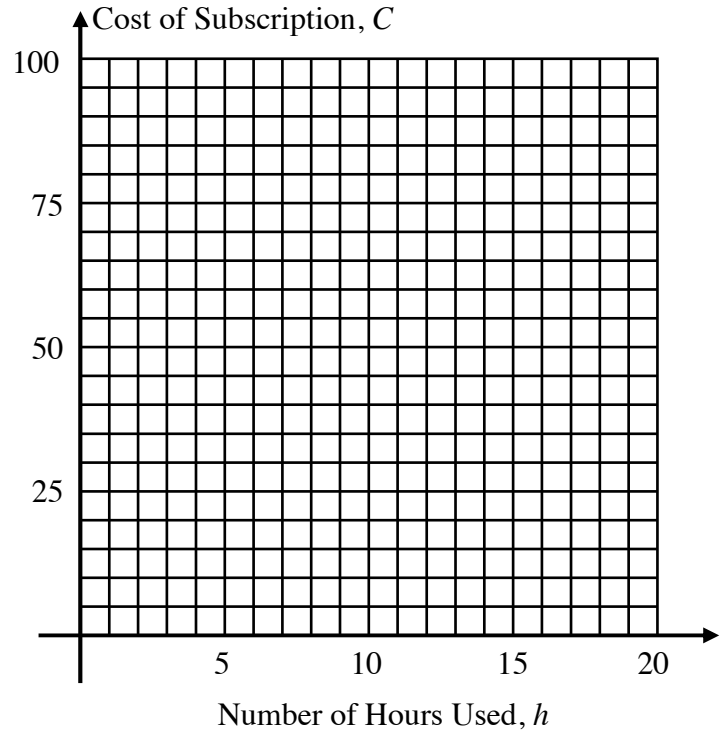
Exercise #2: From 2000 to 2007 the number of coffee shops in a certain country increased by 100 shops per year. In 2002, there were 1100 coffee shops.

(a) Write a linear equation for the number of coffee shops, y , as a function of time, t , where $t = 0$ represents the year 2000.

(b) Based on your linear model from part (a), predict the number of coffee shops that will be in that country in 2025.

Exercise #3: The cost to subscribe to an online internet service consists of a \$15 per month flat-fee and a \$4.00 per hour additional charge.

- (a) Create a linear model to represent the total cost per month, C , as a function of the number of hours, h , that are used.
- (b) Using your calculator to generate a table of values, graph the model you formed in part (a) on the grid provided.
- (c) Lucy was charged \$75 after signing up and using the service for one month. How many hours did she use? Justify your answer both algebraically and graphically.



Exercise #4: Shirley's Workout Shack charges \$6 to sign up and \$3 each time a person works out.

- (a) Write an equation representing the cost, C_1 , to workout at Shirley's as a function of the number of workouts a person has worked out, w .
- (b) Tommy's Pump Up Center charges \$14 to sign up and \$2 for each workout. Create another linear function, as in part (a), for the cost, C_2 , of attending Tommy's Center.
- (c) Graph both equations on the grid to the right. What number of workouts will result in the same cost for both gyms?

