

5-2a Patterns and Functions

Function - a relationship that assigns exactly one output value for each input value

Function Rule - an equation that describes a function relationship

Consider the following relationship between the number of hours (input) and the number of miles (output) if you were driving a car at a constant rate of 60 miles per hour.

Hours (h)	0	1	2	3	4
Miles (m)	0	60	120	180	240

Function Rule

$$m = 60 \cdot h$$

How many miles would you drive in 7.5 ~~hours~~ hours and 30 minutes? 450 miles

Determine the function rule for the following table of values.

x	y
1	\$2.50
2	\$5.00
3	\$7.50
4	\$10.00

$$y = 2.50x$$

x	y
0	5
2	15
4	25
6	35

$$y = 5x + 5$$

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x	y
3	5
5	9
8	15
10	19

$$y = 2x - 1$$

x	y
0	0
1	1
2	4
3	9

$$y = x^2$$

In the above tables, the *x-value* is the **input** and the *y-value* is the **output**. Another name for the input is the **domain** and another name for the output is the **range**.

For the following, write the function rule and find reasonable domain and range values.

1. Maria earns \$7 per hour babysitting. She works no more than 16 hours per week.

$m \rightarrow$ money
 $h \rightarrow$ hours

$$m = 7 \cdot h$$

hours (Domain): $0 \rightarrow 16$

money (range): $0 \rightarrow \$112$

2. Charlie downloads songs at \$0.75 each. He has between \$3.00 and \$6.00 to spend.

$s \rightarrow$ songs
 $m \rightarrow$ money spent

$$m = 0.75s$$

songs (domain): $4 \rightarrow 8$

money (range): $\$3.00 \rightarrow \6.00

Continuous Data - data where numbers between any two data values have meaning

Discrete Data - data that involves a count of items

Describe the Data as either Discrete or Continuous

1. Jaime earns \$8 per hour babysitting. Continuous	4. Jesse buys tickets at \$19 per ticket Discrete
2. Buster pays \$25 per textbook. Discrete	5. The water in the bathtub rises as a rate of 3 gallons per minute. Continuous
3. The function rule model that describes the temperature over a period of 6 hours. Continuous	6. The function rule $P(n) = 18n - 245$ describes your profit as a function of lawns mowed. Discrete

Let's work on Writing Some of These Function Rules

1. Billy can type 35 words per minute.

- a. Write a rule to describe how the amount of words w typed is a function of the number of minutes m spent typing.

$$w = 35m$$

- b. How many words does Billy type in 4 minutes and 30 seconds?

$$w = 35(4.5) = \boxed{158 \text{ Words}}$$

- c. Does this data represent continuous or discrete data?

Discrete if partial words do not count

- d. Justify your answer

Continuous if they do.

2. Steve pays \$0.29 per donut.

- a. Write a rule to describe how the cost c a function of the number of donuts d bought.

$$m = 0.29d$$

- b. How much money do a dozen donuts cost?

$$m = 0.29(12)$$

$$m = \$3.48$$

- c. Does this data represent continuous or discrete data?

Discrete

- d. Justify your answer

We don't count $\frac{1}{2}$ donuts

Determine the function rule for the following table of values.

Cans of Orange Juice	Total Cost
1	\$1.25
2	\$2.50
3	\$3.75
4	\$5.00

2.

Hours a Plumber Works	Cost to Home Owner
1	\$65
2	\$90
3	\$115
4	\$140

3.

Time (hours)	Cost of Bike Rental
1	\$10
2	\$16
3	\$22
4	\$28

Base your answers below on the following situation.

4. The weight (w) of a backpack depends on the number of books (b) in the backpack. Susan's bookbag weighs 2 pounds and each book weighs 2.5 pounds. She can pack at most 5 books.

a) Create a table of values to display a reasonable domain and range for this situation.

Books (b)						
Weight (w)						

b) Determine a function rule to represent the following situation.

c) Does this data represent continuous or discrete data? Justify your response.

d) If Susan crammed 7 books in her bookbag, how much weight would she be carrying?