Day 4 – Creating Function Rules – Notes

Learning Goal: I can create a function rule to describe a relationship. 0 1 2 3 4

Scenario: Consider the following situations...

- The number of hours worked (I) and the money earned (D)

  Money earned depends on hours worked

- Your grade on a test (D) and the number of hours you studied (I)

  your grade depends on how much you study.

- The number of people working on a particular job (I) and the time it takes to complete a job (D)

  The time it takes to complete depends how many people working

- The total cost of a pizza delivery (D) and the number of pizzas ordered (I)

  The total cost depends on how many pizzas you order

- The speed of a car (D) and how far the drives pushes down on the gas pedal (I)

  Speed of car depends on how much you push the pedal

There are two quantities changing in each situation. When one quantity depends on the other in a problem situation, it is said to be the **dependent quantity.** The quantity that the dependent quantity depends on is called the **independent quantity.** When you have a function, the input value that represents the independent quantity is considered the **independent variable** and the output value that represents the dependent quantity is considered the **dependent variable.**

Independent Quantities/Variables	Dependent Quantities/Variables
Input values	Output values
Not changed by other quantities	Changes due to independent quantity
Located on x-axis	Located on y-axis

In the scenarios listed above, circle the independent quantity and underline the dependent quantity. Then name a variable to represent the independent and dependent quantities.

Creating Function Rules

Ex. Create a function rule for the tables below:

A.

x	1	2	3	4
y	−1	0	1	2

$1 - 2 = -1$
$2 - 2 = 0$
$3 - 2 = 1$
$4 - 2 = 2$
$x - 2 = f(x)$

$f(x) = x - 2$

B.

Time Worked (h) x	1	2	3	4
Amount Earned ($) y	5	10	15	20

$1 \times 5 = 5$
$2 \times 5 = 10$
$3 \times 5 = 15$
$4 \times 5 = 20$
$x \times 5 = f(x)$

$f(x) = 5x$

C. {(1, 3), (2, 6), (3, 9), (4, 12)}

$1 \times 3 = 3$
$2 \times 3 = 6$
$3 \times 3 = 9$
$4 \times 3 = 12$
$x \times 3 = f(x)$

$f(x) = 3x$

D. {(1, -6), (2, -5), (3, -4), (4, -3)}

$1 - 7 = -6$
$2 - 7 = -5$
$3 - 7 = -4$
$4 - 7 = -3$
$x - 7 = f(x)$

$f(x) = x - 7$

E. A hot air balloon cruising at 1000 feet begins to ascend. It ascends at a rate of 200 feet per minute. Create a function f to represent the height of the balloon for m minutes. How many minutes does it take to reach 1400 feet?

$f(x) = 1000 + 200x$
$f(x)$ = height; x = # of minutes

$1400 = 1000 + 200x$
$-1000 \quad -1000$
$\frac{400}{200} = \frac{200x}{200}$
$x = 2$

It takes 2 minutes to reach 1400 ft.

F. A fish tank filled with 12 gallons of water is drained. The water drains at a rate of 1.5 gallons per minute. Create a function f to represent the number of gallons remaining after m minutes. How long does it take for the tank to have 3 gallons remaining?

$f(m) = 12 - 1.5m$
$f(m)$ = gallons remaining; m = # of minutes

$3 = 12 - 1.5m$
$-12 \quad -12$
$\frac{-9}{-1.5} = \frac{-1.5m}{-1.5}$
$m = 6$

It takes 6 minutes to reach 3 gallons remaining.

Ex. Create a function rule for each person

Maya runs 7 miles per week and increases her distance by 1 mile each week. Matthew runs 4 miles per week and increases his distance by 2 miles each week.

a. Maya's Function Rule:

$f(x) = 7 + x$
$f(x)$ = total miles; x = # of miles.

b. Matthew's Function Rule:

$g(x) = 4 + 2x$
$g(x)$ = total miles; x = # of miles

c. Who has run farther after 4 weeks?

Maya: $f(4) = 7 + 4$
$f(4) = 11$

Matthew: $f(4) = 4 + 2(4)$
$f(4) = 12$

Matthew has run 12 miles compared to Maya's 11 miles.