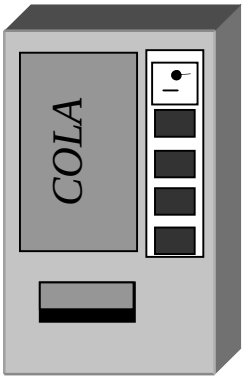
Sec 2.8 – Function Introduction: What's a Function?

Name:

"Do"main INPUT	Ran"ge t" OUTPUT
5¢ 10¢ 25¢ $1 $5	5¢ 10¢ 25¢ $1
PRESSING ONE OF THE AVAILABLE BUTTON	ONE OF THE AVAILABLE COLA PRODUCTS



A coke machine is a good example of a relation that is a **function**. In the machine above assume the price for a soft drink is listed at $1.30 and the top button shows a picture of a 16 oz Coca Cola bottle.

1. If you were to put 2 dollar bills into the coke machine and press the top button what would you get in return?

16oz COCA COLA, 25¢ 25¢ 10¢ 10¢

2. If your repeated the action in step # 1 what would happen? And again?

THE SAME OUTPUT WOULD DO THE SAME

16oz COCA COLA, 25¢ 25¢ 10¢ 10¢

3. What would happen if you put in 8 quarters and pushed the top button? (Remember that is a different input)

16oz COCA COLA, 25¢ 25¢ 10¢ 10¢

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4. **ORDERED PAIRS**: Which of the sets of ordered pairs could be considered a function? List the domain and range if it is a function.

a. $\{(3,5),(2,6),(-5,3)(-7,1),(2,1)\}$ ×

circle one: Function **Not a Function**

Domain:

Range:

b. $\{(-2,1),(3,2),(5,2)(-6,5),(-2,1)\}$

circle one: **Function** Not a Function

Domain: -6, -2, 3, 5

Range: 1, 2, 5

c. $\{(7,2),(5,8),(3,1)(2,9),(-5,7)\}$

circle one: **Function** Not a Function

Domain: -5, 2, 3, 5, 7

Range: 1, 2, 7, 8, 9

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5. **TABLES**: Which of the sets of ordered pairs in each table could be considered a function? List the domain and range if it is a function.

a.

Input	−2	0	2	4	6
Output	0.25	1	4	16	64

circle one: **Function** Not a Function

Domain: -2, 0, 2, 4, 6

Range: 0.25, 1, 4, 16, 64

b.

x	2	0	2	4	6
y	4	−2	4	3	4

circle one: **Function** Not a Function

Domain: 0, 2, 4, 6

Range: -2, 3, 4

c.

x	y
1	4
2	3
1	4
2	2
3	5

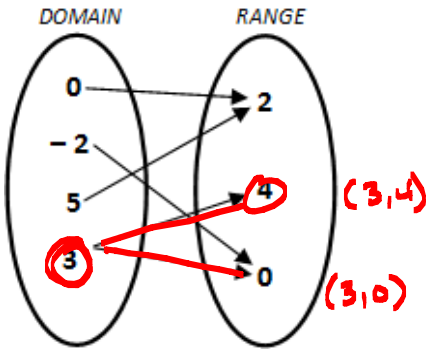
circle one: Function **Not a Function**

Domain:

Range:

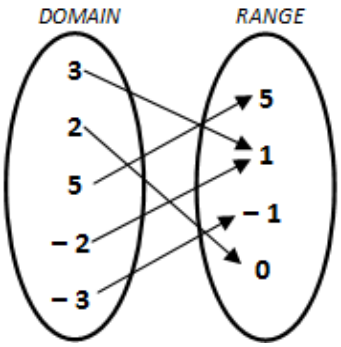
6. **MAPPINGS**: Which of the mappings could be considered a function?

a.



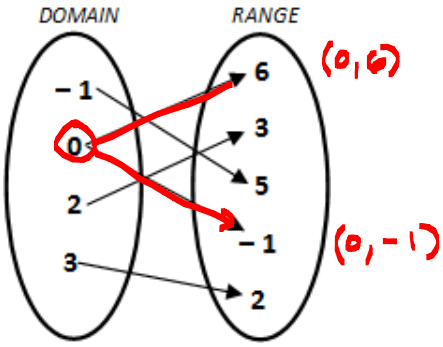
circle one: **Function** **Not a Function**

b.



circle one: **Function** **Not a Function**

c.



circle one: **Function** **Not a Function**

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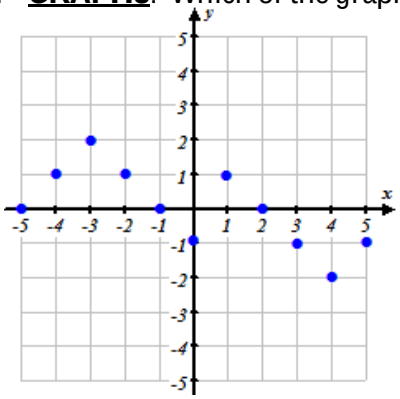
7. **GRAPHS**: Which of the graphs could be considered a function? List the domain and range if it is a function.

a.

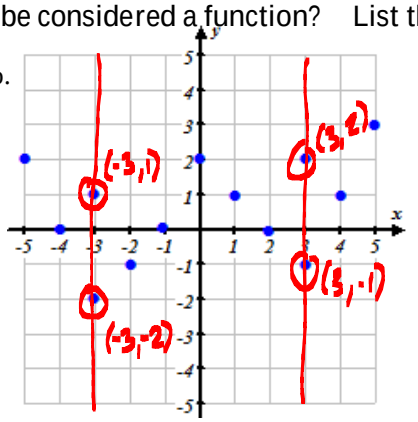


circle one: **Function** **Not a Function**

Domain: −5, −4, −3, −2, −1, 0, 1, 2, 3, 4, 5

Range: −2, −1, 0, 1, 2

b.

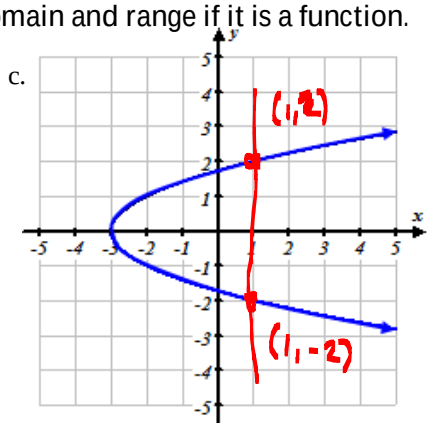


circle one: **Function** **Not a Function**

Domain: X

Range: X

c.

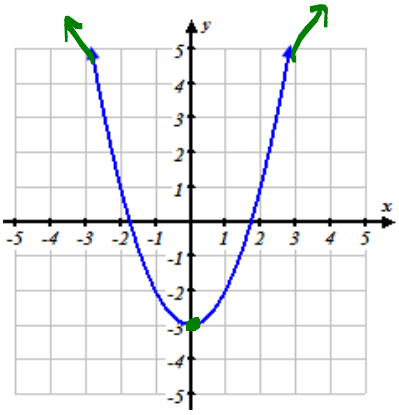


circle one: **Function** **Not a Function**

Domain: X

Range: X

d.

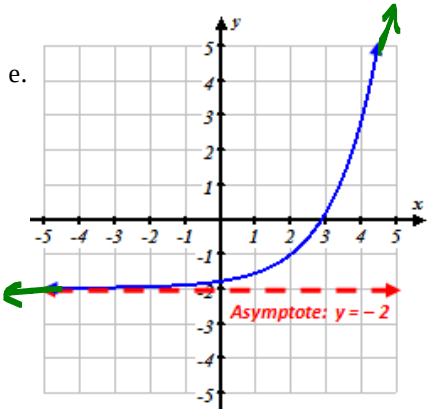


circle one: **Function** **Not a Function**

Domain: (x) ALL REAL NUMBERS (ℝ)

Range: (y) $y \geq -3$

e.

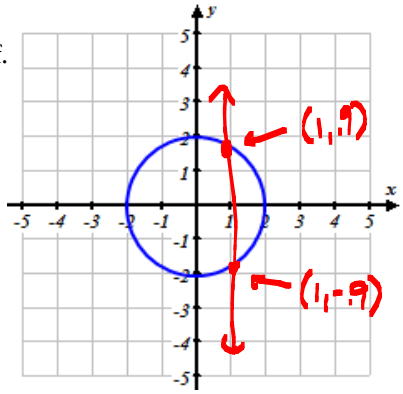


circle one: **Function** **Not a Function**

Domain: (LEFT, RIGHT) ALL REAL NUMBERS (ℝ)

Range: (UP, DOWN) $y > -2$

f.



circle one: **Function** **Not a Function**

Domain: X

Range: X

8. **SITUATIONAL EXAMPLES**: Which of the situations could be considered a function? List the domain and range if it is a function.

(MATT, 2) (MATT, 4)

a. A school administrator is using a database program called SASI. The administrator types a student number in the top box and the program returns the number of missed days in the bottom box. Each student has a unique ID number and the maximum number of absences any student has is 12 days.

circle one: **Function** / Not a Function

Domain: ANY VALID STUDENT ID NUMBER

Range: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

b. A teacher starting her first day of class tells the class that she will call out their first name and then the student is to respond with the total number of brothers and sisters they have. In the class there are 2 different students named Matt. The first student named Matt has 2 siblings the other has 4 siblings.

circle one: Function / **Not a Function**

Domain:

Range:

c. The Yellow Taxi Cab Company in a city charges $3.00 as soon as you get in the cab and then an additional $0.50 for each mile they drive their customers. They are limited to driving a maximum distance of 20 miles

$f(x) = 3 + 0.50x$

$f(0) = 3 + 0.5(0) = 3$

$f(20) = 3 + 0.5(20) = 13$

circle one: **Function** / Not a Function

Domain: $0 \le x \le 20$

Range: $3 \le y \le 13$

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9. Which of the equations could be written such that **y is a function of x**?

Circle each equation that could be written such that y is a function of x.

a. $y = 3x + 1$ — FUNCTION ✓

b. ~~$y^2 = x^2$~~ — "y" RAISED TO EVEN POWER — FAILS VERTICAL LINE TEST

c. ~~$y = \pm 2^x$~~ — ± WITH AN "x" — FAILS VERTICAL LINE TEST

d. $y^3 = x + 1$ — FUNCTION ✓

e. ~~$y^4 + y = x^2$~~ — "y" RAISED TO AN EVEN POWER — FAILS VERTICAL LINE TEST

Y WOULD NOT BE A FUNCTION OF X IF:

- Y IS RAISED TO AN EVEN POWER
- ± WITH AN X
- IF Y IS IN ABSOLUTE VALUE BRACKETS

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10. **FUNCTION NOTATION**. Given the function $f(x) = 3x + 2$, determine the following:

a. $f(3)$

$f(x) = 3x + 2$

$f(3) = 3(3) + 2$

$= 9 + 2$

$= \boxed{11}$ ✓

b. $f(t + 1)$

$f(x) = 3x + 2$

$f(t+1) = 3(t+1) + 2$

$= 3t + 3 + 2$

$= \boxed{3t + 5}$ ✓

c. What is ***x*** if $f(x) = 17$?

$f(x) = 3x + 2$

$17 = 3x + 2$

$-2 \quad -2$

$\frac{15}{3} = \frac{3x}{3}$

$\boxed{5 = x}$ ✓

11. **FUNCTION NOTATION**. Given the function $d(x) = x^2 + 3^x$, determine the following:

a. $d(2)$

$d(x) = x^2 + 3^x$

$d(2) = (2)^2 + 3^{(2)}$

$= 4 + 9$

$= \boxed{13}$

2→X
X²+3^X
2
13

b. $d(0)$

$d(x) = x^2 + 3^x$

$d(0) = (0)^2 + 3^0$

$= 0 + 1$

$= \boxed{1}$

0→X
X²+3^X
0
1

12. **FUNCTION NOTATION**. Given the function

x	−2	0	2	4	6
$g(x)$	4	−2	3	6	4

determine the following:

a. $g(0) = -2$

$x = 0$ IS INPUT

FIND WHERE $x=0$ IN THE TABLE

b. $g(4) = 6$

$x = 4$ IS THE INPUT

FIND WHERE $x=4$ IN THE TABLE

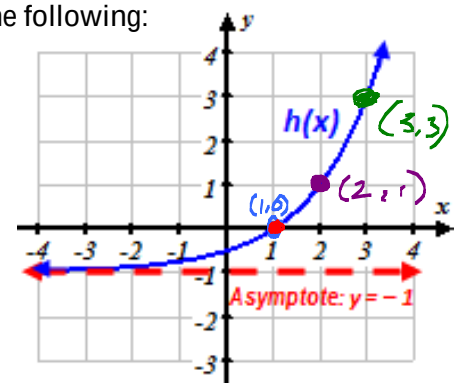
c. What is x if $g(x) = 4$?

$x = -2$ OR 6

THE OUTPUT WAS 4

FIND IN THE TABLE WHERE $g(x) = 4$

13. **FUNCTION NOTATION**. Given the graph of the function h(x) determine the following:



a. $h(1) = 0$

$x = 1$ IS THE INPUT

FIND WHERE $x=1$ IN THE GRAPH

b. $h(3) = 3$

$x = 3$ IS THE INPUT

FIND WHERE $x=3$ IN THE GRAPH

c. What is x if $h(x) = 1$?

THE OUTPUT WAS $y=1$ → THE INPUT MUST HAVE BEEN $x = 2$

14. **FUNCTION NOTATION**. Given the function $b(x)$: (2,3), (1,4), (4,2), (5,3), (3,0), determine the following:

a. $b(2) = 3$

$x = 2$ IS THE INPUT

b. $b(3) = 0$

$x = 3$ IS THE INPUT

c. What is x if $b(x) = 3$?

THE OUTPUT WAS $y=3$

THEN $x = 2$ OR 5

15. **FUNCTION NOTATION**. Given $f(8) = (8)^2 + 2(8)$, determine a possible equation for $f(x)$

$$f(x) = (x)^2 + 2(x)$$

16. **FUNCTION NOTATION**. Given the partial set of values for the function $h(x)$, determine a possible equation for $h(x)$.

x	−2	0	1	2	3
$h(x)$	−6	0	3	6	9

SLOPE $= \frac{3}{1}$

$h(x) = 3x$

$(0,0)$ $(1,3)$

$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-0}{1-0} = \frac{3}{1} = 3$

$y = mx + b$

$y = 3x + b$

TEST $(0,0)$

$(0) = 3(0) + b$

$0 = 0 + b$

$0 = b$

$y = 3x + 0$

$h(x) = 3x$

CONSISTENT RATE OF CHANGE SUGGESTS A LINEAR FUNCTION

17. **FUNCTION NOTATION**. Given the partial set of values for the function $p(x)$, determine a possible equation for $p(x)$.

x	0	1	2	3	4
$p(x)$	2	3	4	5	6

SLOPE $= \frac{1}{1}$

$P(x) = 1x + 2$

$(0,2)$ $(1,3)$

$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-2}{1-0} = \frac{1}{1} = 1$

$y = mx + b$

TEST $(0,2)$

$y = 1x + b$

$(2) = 1(0) + b$

$2 = 0 + b$

$2 = b$

$y = 1x + 2$

$P(x) = 1x + 2$