Linear Functions

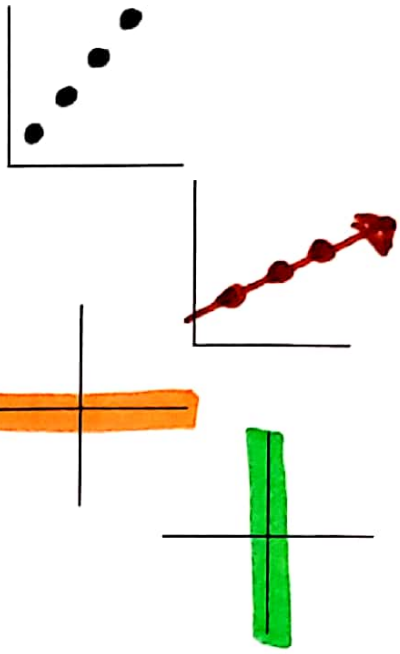
Vocabulary:

Discrete: points on a graph that do not connect

Continuous: points that always connect, "Never stops"

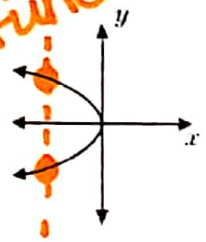
★ Domain: Independent, input, all x-values

★ Range: Dependent, output, all y-values

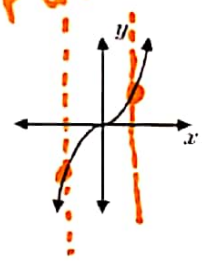


How do we determine if a graph is a function? Vertical Line Test

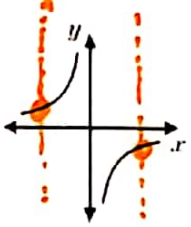
Not a function



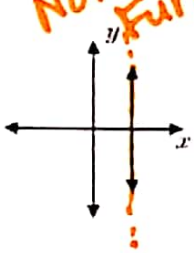
Function



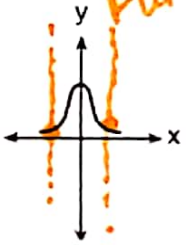
Function



Not a Function

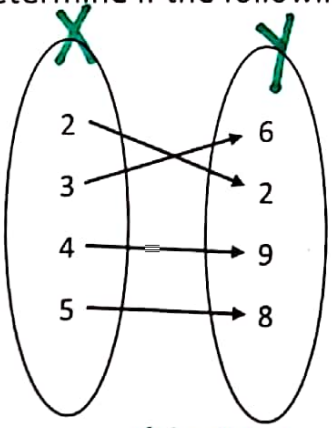


Function



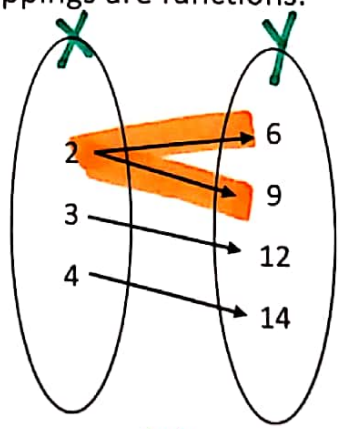
Determine if the following mappings are functions.

1.



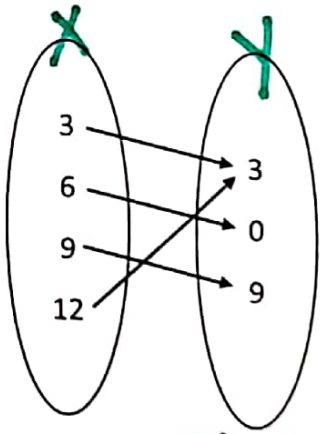
Function

2.



Not a function

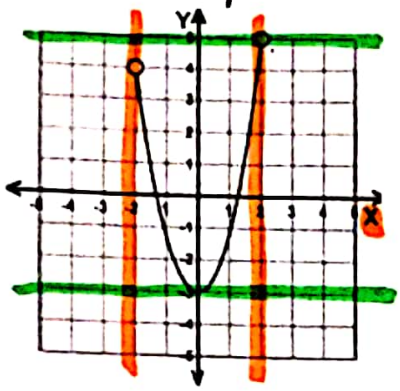
3.



Function

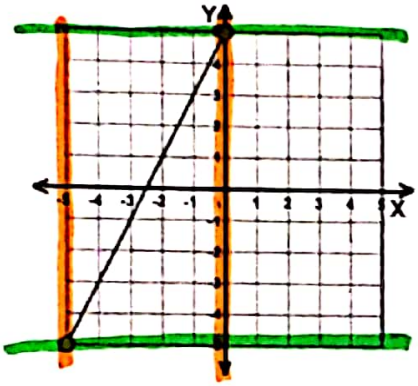
Domain: $-2 < x < 2$

Range: $-3 \leq y < 5$



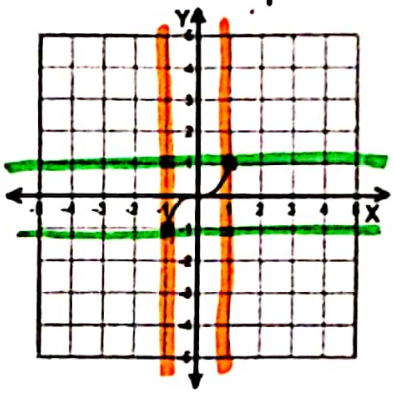
Domain: $-5 < x < 0$

Range: $-5 < y < 5$



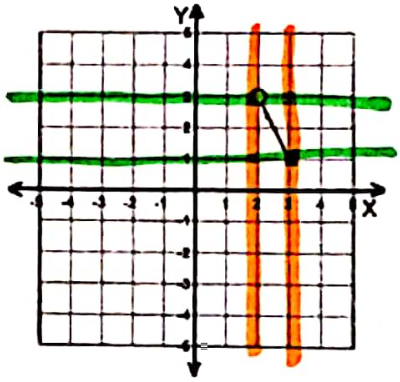
Domain: $-1 \leq x \leq 1$

Range: $-1 \leq y \leq 1$



Domain: $2 < x \leq 3$

Range: $1 \leq y < 3$



Function Notation

$f(x) = 3x + 1$

"the function of x"

Using f(x) = 3x + 1 and h(x) = ½ x – 1

Equation

$y = 3x + 1$

f(x) is the same as y

A. Find f(1)

$f(1) = 3x + 1$

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

$= 3 + 1$

$f(1) = 4$

Side Note:

- f(1) means when x = 1, so we plug in a 1 anywhere we see an x.

$h(x) = \frac{1}{2}x - 1$

B. Find h(2)

$h(2) = \frac{1}{2}x - 1$

$h(2) = \frac{1}{2}(2) - 1$

$= 1 - 1$

$\boxed{h(2) = 0}$

C. Find f(2) – h(4)

$f(2) = 3x + 1$

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

$= 6 + 1$

$f(2) = 7$

$h(4) = \frac{1}{2}x - 1$

$h(4) = \frac{1}{2}(4) - 1$

$= 2 - 1$

$= 1$

$f(2) - h(4)$

$7 - 1$

$\boxed{6}$

D. Given the domain {22, 31, 33} find the range of f(x) = x -19.

X y y

$x = 22$ $x = 31$ $x = 33$

$f(22) = 22 - 19$ $f(31) = 31 - 19$ $f(33) = 33 - 19$

$f(22) = 3$ $f(31) = 12$ $f(33) = 14$

$\boxed{\text{Range: } \{3, 12, 14\}}$

E. Given the range {18, 32, 39} find the domain of g(x) = 7x – 3. Find x!

y X y

$y = 18$ $y = 32$ $y = 39$

$18 = 7x - 3$ $32 = 7x - 3$ $39 = 7x - 3$

$+3 \quad +3$ $+3 \quad +3$ $+3 \quad +3$

$\frac{21}{7} = \frac{7x}{7}$ $\frac{35}{7} = \frac{7x}{7}$ $\frac{42}{7} = \frac{7x}{7}$

$3 = x$ $5 = x$ $6 = x$

$\boxed{\text{Domain: } \{3, 5, 6\}}$