

1.2 Functions and Graphs

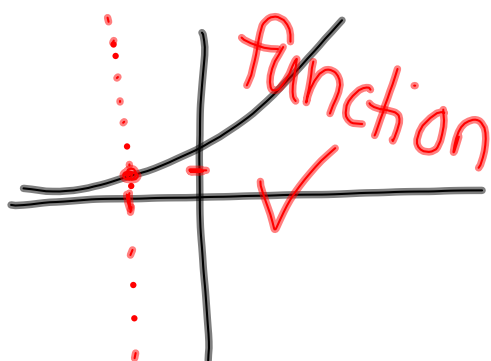
Domain - the set of all input (x) values for which a function is defined

Range - output of the domain

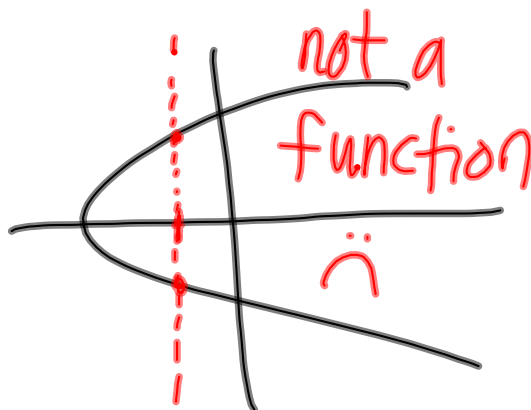
function - a relation in which each input has a unique output

Vertical Line Test

a vertical line drawn through the graph of a function can intersect it at most once.



v.



$$\{(1,2), (3,4), (5,6), (7,1)\}$$

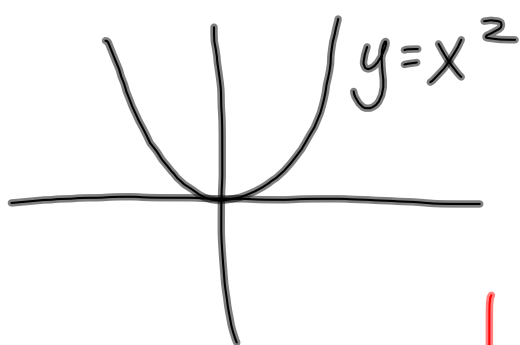
function? *yes*

domain? $\{1, 3, 5, 7\}$

range? $\{2, 4, 6, 1\}$

$$\{(1,2), (2,2), (3,2), (4,2)\}$$

function? *yes*

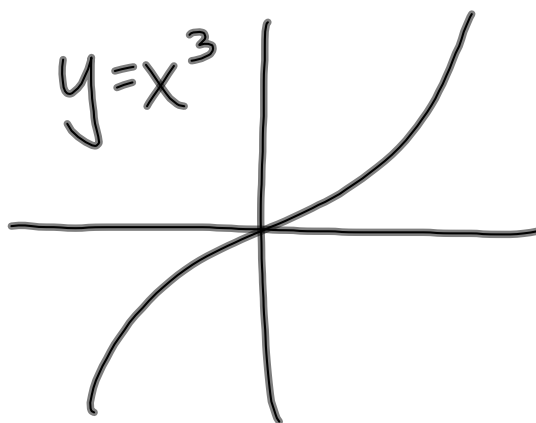


domain:

$$\mathbb{R} = (-\infty, \infty)$$

range:

$$[0, \infty)$$

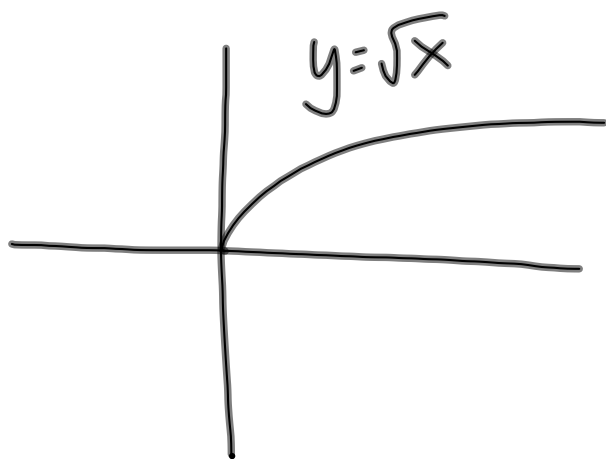


domain:

$$(-\infty, \infty)$$

range:

$$(-\infty, \infty)$$

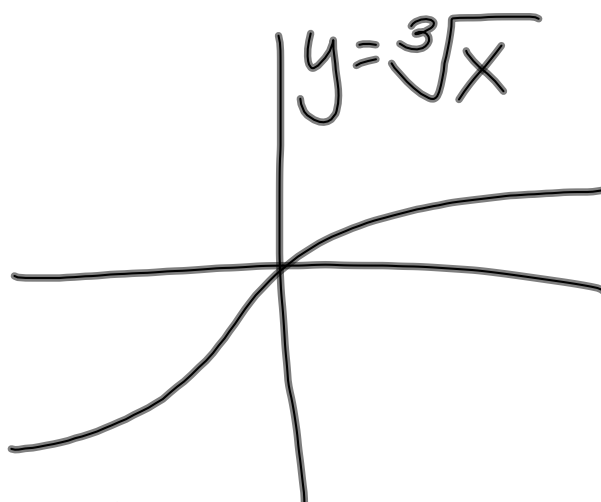


domain:

$$[0, \infty)$$

range:

$$[0, \infty)$$

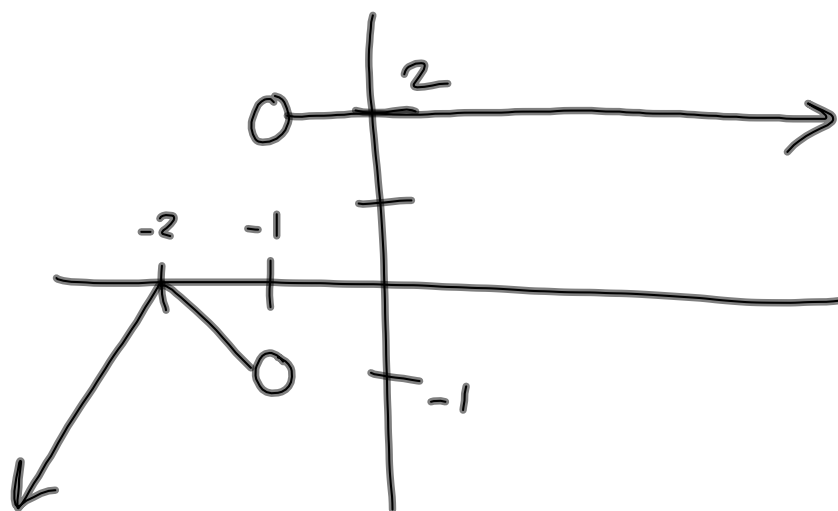


domain:

$$(-\infty, \infty)$$

range:

$$(-\infty, \infty)$$



domain: $\{x \mid x \neq -1\} = (-\infty, -1) \cup (-1, \infty)$

range: $(-\infty, 0] \cup \{2\}$

$$f(x) = \sqrt{x}$$

$$\{x \mid x \geq 0\}$$

$$f(x) = \sqrt{2-x}$$

$$2-x \geq 0$$

$$\{x \mid x \leq 2\}$$

$$f(x) = \frac{1}{x}$$

$$\{x \mid x \neq 0\}$$

$$f(x) = \frac{27x^5}{5x+3}$$

$$5x+3 \neq 0$$

$$\{x \mid x \neq -\frac{3}{5}\}$$

$$f(x) = \frac{1}{\sqrt{x}}$$

$$\{x \mid x > 0\}$$

$$f(x) = \frac{x+7}{\sqrt{x+4}}$$

$$\{x \mid x > -4\}$$

$$f(x) = \frac{\sqrt{x+2}}{x-5}$$

$$x+2 \geq 0$$

$$x \geq -2$$

$$x-5 \neq 0$$

$$x \neq 5$$



$$[-2, 5) \cup (5, \infty)$$

Find the function value

$$f(x) = 2x^2 - 5$$

$$f(3) = 2(3)^2 - 5 = \boxed{13}$$

$$f(x) = -x^3 - x^2$$

$$f(-2) = -(-2)^3 - (-2)^2 = 8 - 4 = \boxed{4}$$

$$f(x) = 5x^2 - 4x$$

$$f(x+h) = 5(x+h)^2 - 4(x+h)$$

$$= 5(x^2 + 2xh + h^2) - 4x - 4h$$

$$= \boxed{5x^2 + 10xh + 5h^2 - 4x - 4h}$$

$$f(x) = \frac{\sqrt{x-3}}{x+5}$$

$$x \geq 10, x \neq 2$$



$$f(x-7) = \frac{\sqrt{x-10}}{x-2}$$

Domain:
 $\{x \mid x \geq 10\}$
 $[10, \infty)$

$$f(x-7) = \frac{\sqrt{x-7-3}}{x-7+5}$$

Homework:

1.2 #15-29 odd

40, 41, 42, 45, 48