1.2 Functions and Graphs

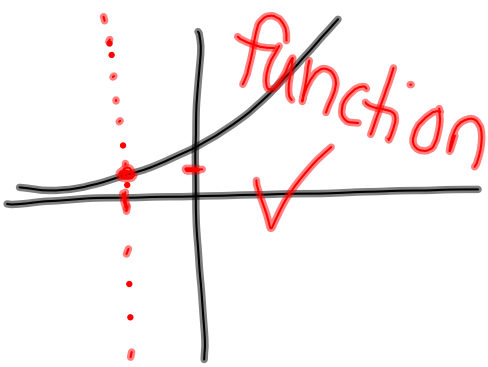
Domain is the set of all input values (x) for which the function is defined

Range is the output of the domain

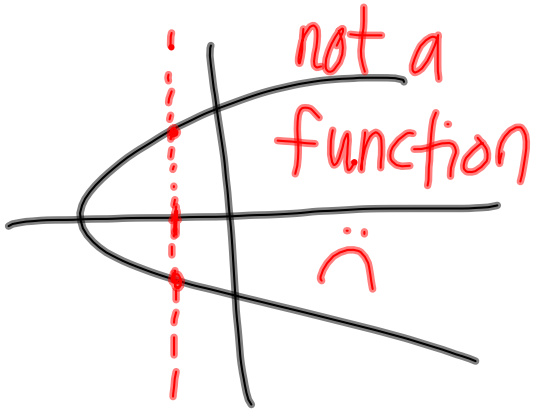
function is a relation in which each input has a unique output

Vertical Line Test

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



v.



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

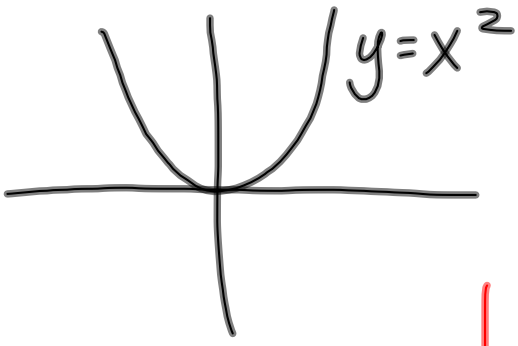
function? yes

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

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

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

function? yes

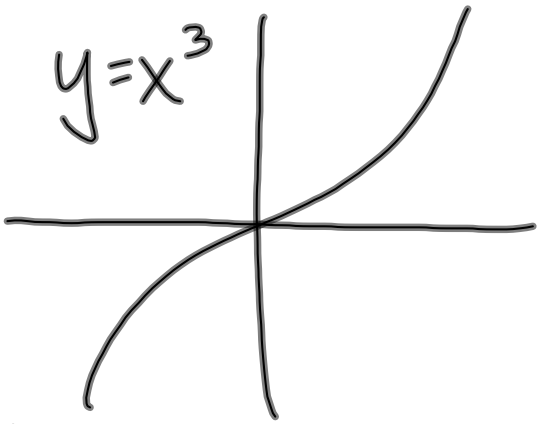


domain:

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

range:

$[0, \infty)$

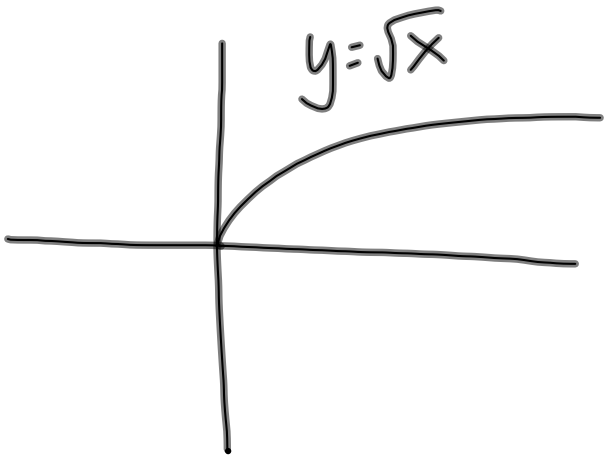


domain:

$(-\infty, \infty)$

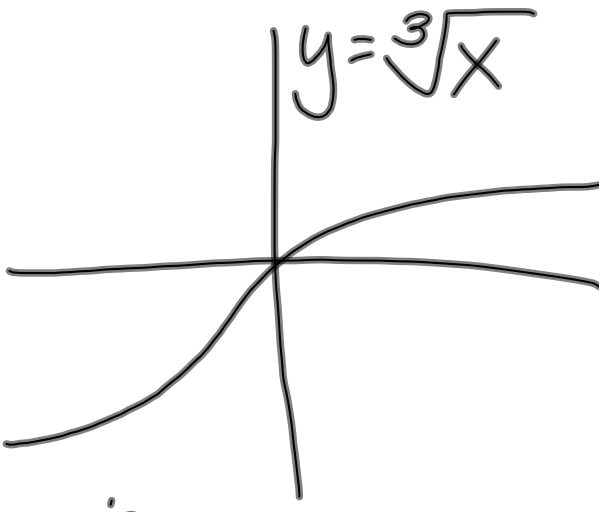
range:

$(-\infty, \infty)$



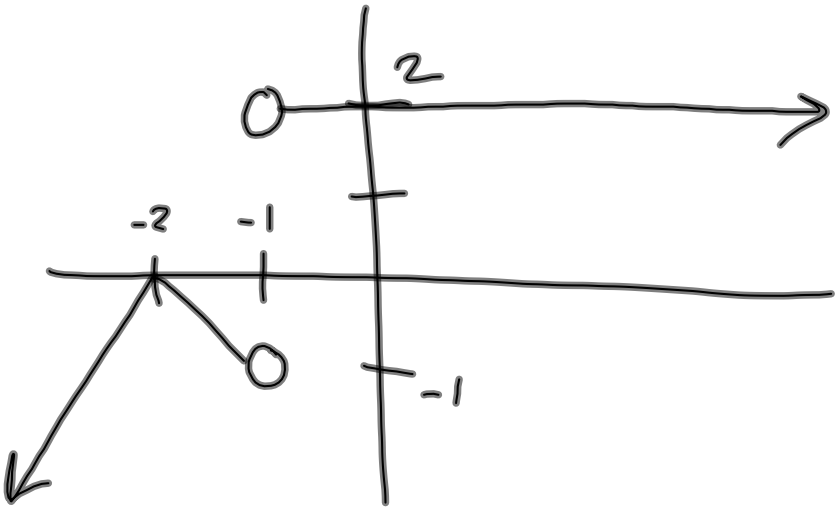
domain: $[0,\infty)$

range: $[0,\infty)$



domain: $(-\infty,\infty)$

range: $(-\infty,\infty)$



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

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

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

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

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

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

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

$5 - x \geq 0$

$5 \geq x$

$\{x \mid x \leq 5\}$

$f(x) = \frac{27x+2}{5x-3}$

$5x - 3 \neq 0$

$5x \neq 3$

$\{x \mid x \neq 3/5\}$

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

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

$f(x) = \frac{7}{\sqrt{x-6}}$

$x - 6 > 0$

$\{x \mid x > 6\}$

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

$x - 5 \neq 0 \; ; \; x + 2 \geq 0$

$x \neq 5 \; ; \; x \geq -2$

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

Find the function value

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

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

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

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

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

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

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

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

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

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

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

Homework:

1.2 #15-29 odd

40, 41, 42, 45, 48