

Review Chapter 1

- Match the equation with the graph with the table

(A) $y = 2x + 3$

(C) $y = 12 - 3x$

(E) $y = \sqrt{8 - x}$

| | | | | | | |
|---|---|---|----|----|----|----|
| x | 1 | 2 | 3 | 4 | 5 | 6 |
| y | 6 | 9 | 14 | 21 | 30 | 41 |

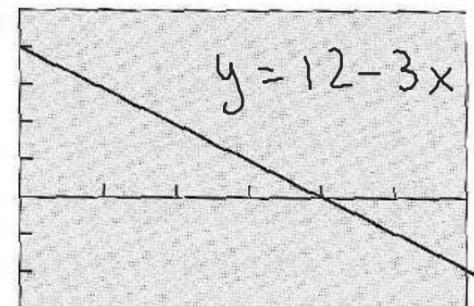
3 5 7 $\downarrow y = x^2 + 5$

(B) $y = x^2 + 5$

(D) $y = 4x + 3$

$$y = 1^2 + 5 = 6$$

$$y = 2^2 + 5 = 9$$



[0, 6] by [-9, 15]

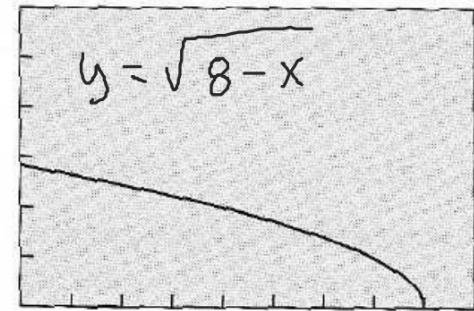
| | | | | | | |
|---|---|---|----|----|----|----|
| x | 0 | 2 | 4 | 6 | 8 | 10 |
| y | 3 | 7 | 11 | 15 | 19 | 23 |

$$m = \frac{4}{2}$$

$$m = \frac{4}{2}$$

$$m = \frac{4}{2}$$

$y = 2x + 3$



[0, 9] by [0, 6]

Solve the equation algebraically

$$x(2x - 1) = 10$$

$$2x^2 - x = 10$$

$$2x^2 - x - 10 = 0$$

$$(2x - 5)(x + 2) = 0$$

$4x - 5x = -1x$

$$\begin{array}{rcl} 2x - 5 & = & 0 \\ +5 & & +5 \\ \hline 2x & = & 5 \\ \frac{2x}{2} & & \frac{5}{2} \\ x & = & 5/2 \end{array} \quad \begin{array}{rcl} x + 2 & = & 0 \\ -2 & & -2 \\ \hline x & = & -2 \end{array}$$

Find the domain of the function algebraically

$$f(x) = \frac{\sqrt{9-x}}{(x+3)(x^2+4)}$$

$$x+3 \neq 0$$

$$\boxed{x \neq -3}$$

$$x^2+4 \neq 0$$

$$\sqrt{x^2+4} \neq 0$$



$$9-x \geq 0$$

$$+x +x$$

$$\boxed{9 \geq x}$$

$$\boxed{(-\infty, -3) \cup (-3, 9]}$$

Find the domain of the function algebraically

$$f(x) = \frac{5x - 1}{(x + 2)(x - 4)}$$

$$x + 2 = 0 \quad x - 4 = 0$$

$$x \neq -2 \quad x \neq 4$$

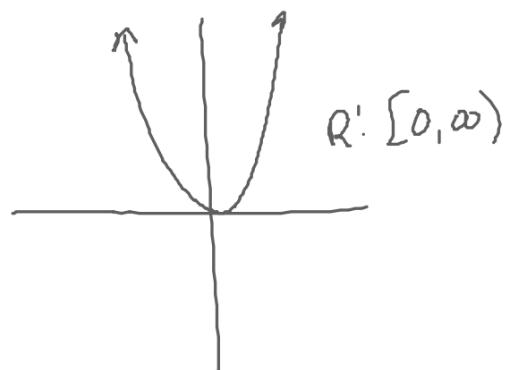
$$(-\infty, -2) \cup (-2, 4) \cup (4, \infty)$$

Find the domain and range of the following function

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

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

$$R: [2, \infty)$$

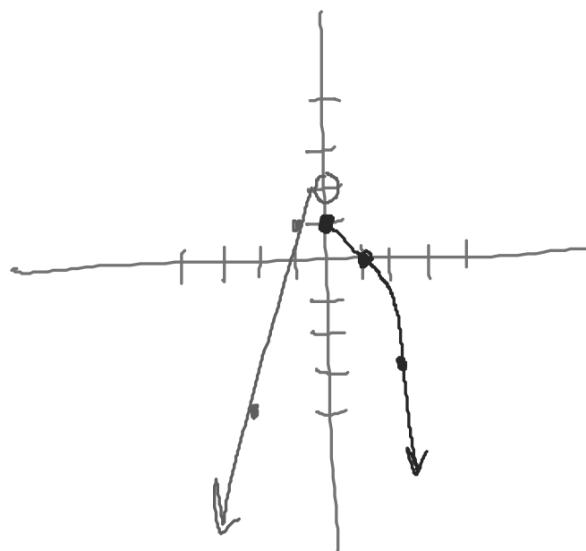


Graph the piecewise function

$$f(x) = \begin{cases} 3x + 2 & x < 0 \\ 1 - x^2 & x \geq 0 \end{cases}$$

$$\begin{array}{|c|c|}\hline x & y = 3x + 2 \\ \hline 0 & 2 \\ -1 & -1 \\ -2 & -4 \\ \hline \end{array}$$

$$\begin{array}{|c|c|}\hline x & y = 1 - x^2 \\ \hline 0 & 1 \\ 1 & 0 \\ 2 & -3 \\ \hline \end{array}$$



Determine any points of discontinuity. Label them as removeable or non-removeable. Also, determine any horizontal asymptotes.

$$\text{H.A.: } y = 0$$

$$f(x) = \frac{x}{x^2 - 2x} = \frac{x}{x(x-2)}$$

$$x=0 \quad x=2$$

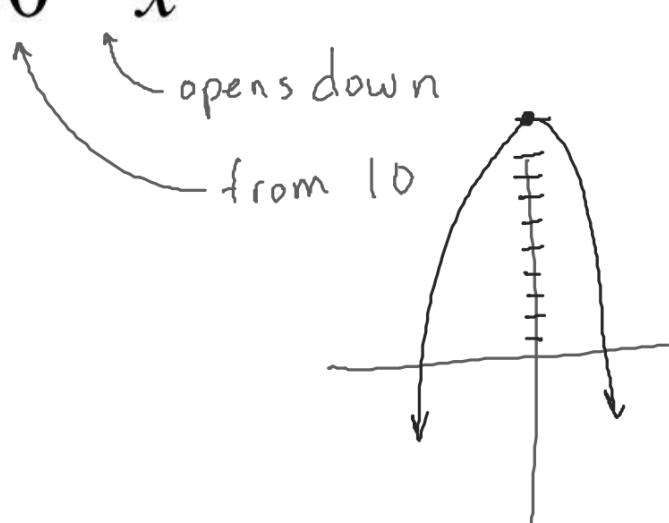
Hole VA

Removable Infinite

Find the range of the function algebraically

$$f(x) = 10 - x^2$$

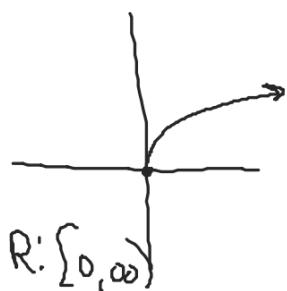
Range: $(-\infty, 10]$



Find the range of the function algebraically

$$f(x) = 5 + \sqrt{4 - x}$$

Affects Range *Affects Domain*



$$\text{Range: } [5, \infty)$$

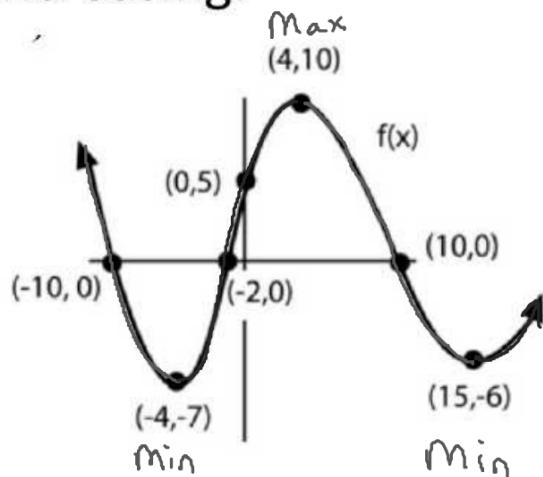
$$R: [0, \infty)$$

Graph the function and tell whether or not it has a point of discontinuity at $x = 0$. If there is a discontinuity, tell whether it is removable or non-removable.

$$f(x) = \frac{x^3 + x}{x} = \frac{x(x^2 + 1)}{x}$$

$x=0$ Hole (removable)

State whether each labeled point identifies a local maximum, a local minimum, or neither. Identify intervals on which the function is decreasing and increasing.



y decreasing

$$(-\infty, -4)$$

$$(4, 15)$$

y-increasing

$$(-4, 4)$$

$$(15, \infty)$$

Determine whether the function is even, odd, or
~~even~~, neither

$$A) f(x) = \frac{1}{3x^2 + 2}$$

$$f(1) = \frac{1}{3+2} = \frac{1}{5}$$

$$f(-1) = \frac{1}{3+2} = \frac{1}{5}$$

$$B) f(x) = \frac{1}{3x}$$

$$f(1) = \frac{1}{3}$$

$$f(-1) = -\frac{1}{3}$$

odd \rightarrow origin symmetry

Determine all horizontal and vertical asymptotes

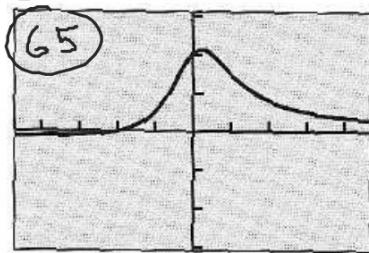
$$f(x) = \frac{4x^2 + 2}{8 - 2x^2}$$

HA: $y = \frac{4x^2}{-2x^2} = -2$

VA: $8 - 2x^2 = 0$
 $8 = 2x^2$
 $\sqrt{4} = \sqrt{x^2}$
 $\pm 2 = x$

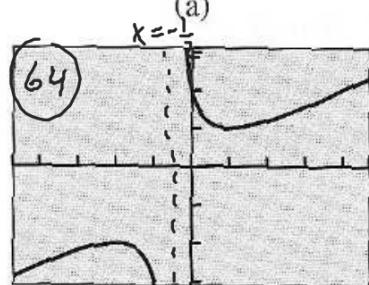
63. $y = \frac{x+2}{2x+1}$ HA: $y = \frac{1}{2}$
VA: $x = -\frac{1}{2}$

65. $y = \frac{x+2}{2x^2+1}$ HA: $y = 0$
VA: None



[−4.7, 4.7] by [−3.1, 3.1]

(a)

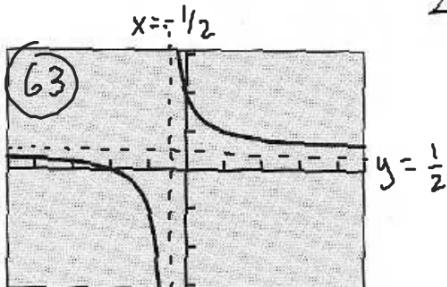


[−4.7, 4.7] by [−3.1, 3.1]

(c)

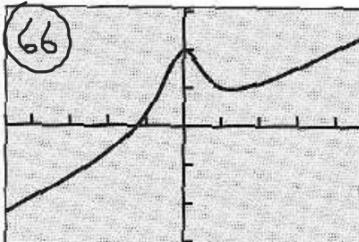
64. $y = \frac{x^2+2}{2x+1}$ HA: $y = \frac{1}{2}$
VA: $x = -\frac{1}{2}$

66. $y = \frac{x^3+2}{2x^2+1}$



[−4.7, 4.7] by [−3.1, 3.1]

(b)



[−4.7, 4.7] by [−3.1, 3.1]

(d)

Identify which of the twelve basic functions are even or odd.

$$y = x$$

$$y = \ln x$$

$$y = x^2$$

$$y = \sin x$$

$$y = x^3$$

$$y = \cos x$$

$$y = \frac{1}{x}$$

$$y = |x|$$

$$y = \sqrt{x}$$

$$y = \text{int}(x)$$

$$y = e^x$$

$$y = \frac{1}{1+e^{-x}}$$

Even

$$y = x^2$$

$$y = \cos x$$

$$y = |x|$$

Odd

$$y = x$$

$$y = \sin x$$

$$y = x^3$$

$$y = \frac{1}{x}$$

Neither

$$y = \ln x$$

$$y = \sqrt{x}$$

$$y = \text{int}(x)$$

$$y = e^x$$

$$y = \frac{1}{1+e^{-x}}$$