

$$V = LWH$$

$$L = x = 1.17$$

$$W = x$$

$$H = 7 - 4x$$

$$V = 3.18$$

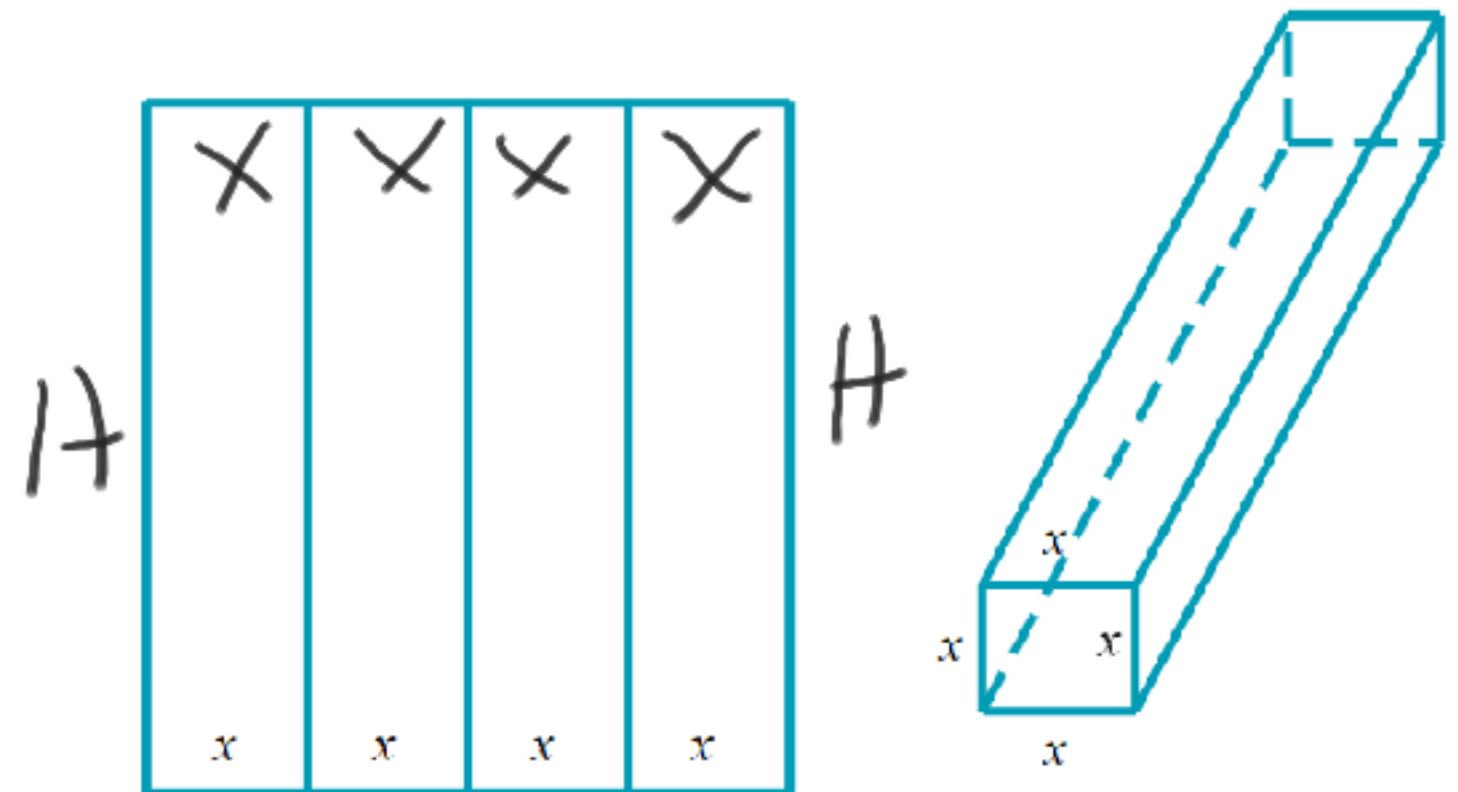


Figure 1

Figure 2

$$2H + 8x = 14$$

$$2H = 14 - 8x$$

$$H = 7 - 4x$$

The functions f and g are defined as follows.

$$f(x) = \frac{x}{x^2 + 64}$$

$$x^2 + 64 \neq 0$$
$$\sqrt{x^2} \neq \sqrt{-64}$$

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

$$g(x) = \frac{x-6}{x^2-36}$$

$$x^2 - 36 \neq 0$$
$$\sqrt{x^2} \neq \sqrt{36}$$

For each function, find the domain.

$$(-\infty, -6) \cup (-6, 6) \cup (6, \infty)$$

$$x \neq \pm 6$$

Graph all vertical and horizontal asymptotes of the rational function.

$$f(x) = \frac{8}{2x+9}$$

Denominator = D

Numerator = N
Degrees

$$2x + 9 = 0$$

$$2x = -9$$

$$x = -\frac{9}{2} \text{ Vertical Asy.}$$

Horizontal Asymptotes

$$D > N$$

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

$$N > D$$

No H.A.

$$N = D$$

H.A. \rightarrow

$$\frac{\text{L.C. } N}{\text{L.C. } D}$$

$$y = 0$$

Graph all vertical and horizontal asymptotes of the rational function.

$$f(x) = \frac{-9}{4x-10} \quad \text{V.A.}$$

$$4x-10=0$$

$$4x=10$$

$$x = \frac{5}{2}$$

$$\text{H.A.}$$

$$y=0$$

Graph all vertical and horizontal asymptotes of the rational function.

$$f(x) = \frac{3x-4}{-3x-9}$$

$$\begin{aligned} \text{V.A.} &= -3x-9=0 \\ &-3x=-9 \\ &x=-3 \end{aligned}$$

$$\text{H.A.} = y = \frac{3}{-3} = -1$$

Graph all vertical and horizontal asymptotes of the rational function.

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

$$- (x^2 + 3x + 2)$$
$$- (x + 2)(x + 1)$$

$x \neq -2$ $x \neq -1$ V.A.

$$x^2 + 3x - 4$$
$$(x + 4)(x - 1)$$

H.A. $y = \frac{1}{-1} = -1$

Graph the rational function.

$$VA = -x + 2 = 0$$
$$x = 2$$

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

H.A. $y = \frac{2}{-1} = -2$

x	y
0	-1/2
1	1/1
2	X
3	5/-1
4	7/-2

Graph all asymptotes of the rational function.

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

$$\begin{array}{r} -3 \overline{) -1 \quad -5 \quad 2} \\ \underline{-1 \quad -2 \quad 6} \\ 8 \end{array}$$

$-1x - 2$

$$\begin{aligned} \text{VA} \quad x + 3 &= 0 \\ x &= -3 \end{aligned}$$

S, VA. $y = -x - 2$

Graph the rational function.

$$f(x) = \frac{3x^2 - 12x + 4}{x - 2}$$

2

3	-12	4
6	-12	
3	-6	-8

V.A. $x = 2$

S.A. $y = 3x - 6$

X	Y
0	-2
1	5
2	x
3	-5
4	2

Graph the rational function.

$$g(x) = \frac{5x+25}{x+5}$$

$$\begin{array}{l} 5x+25 \\ 5(x+5) \end{array}$$

V.A. / Hole

$$x+5=0$$

$$x = -5$$

Hole

$$g(x) = 5$$

Graph the rational function.

$$f(x) = \frac{3x-12}{x^2-5x+4} = \frac{3(x-4)}{\cancel{(x-4)}(x-1)}$$

VA $x=1$
Hole $x=4$

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

H.A. $y=0$

X	Y
-1	3/-2
0	3/-1
1	X
2	3/1
4	3/3

Graph the rational function.

$$f(x) = \frac{10x - 20}{x^2 - x - 20} = \frac{10(x - 2)}{(x + 4)(x - 5)}$$

V.A.
 $x = -4$
 $x = 5$

H.A. $y = 0$

X	y
-6	-40/11
-5	-7
-4	X

X	y
0	1
1	1/2
5	X
6	4
7	25/11

$(2, -1)$

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

$$y = \frac{a}{(x-3)(x+5)}$$

$$-1 = \frac{a}{(2-3)(2+5)} = \frac{a}{(-1)(7)} = \frac{a}{-7}$$

$$-1 = \frac{a}{-7} \rightarrow 7 = a$$

The figure below shows the graph of a rational function f .

It has vertical asymptotes $x = 1$ and $x = 5$, and horizontal asymptote $y = 2$.

The graph has x -intercepts 3 and -1 , and it passes through the point $(2, 2)$.

$(2, 2)$

$$\hat{f}(x) = \frac{a(x-3)(x+1)}{(x-1)(x-5)}$$

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