

State the ALL asymptotes of the following rational functions.

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

VA: $x = 1$

SA: $y = 2x + 2$

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

VA: $x = -1$

HA: $y = -2$

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

VA: $x = -1, 1$

HA: $y = 0$

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

VA: $x = 3, -1$

HA: $y = 2$

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

VA: $x = -2$

HA: $y = 3$

6) $q(x) = \frac{x^2 + 3x - 10}{x + 1}$

VA: $x = -1$

SA: $y = x + 2$

State the domain of the following functions.

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

$(-\infty, 1) \cup (1, \infty)$

8) $g(x) = \frac{3x}{x^2 - 2x + 1}$

$(-\infty, 1) \cup (1, \infty)$

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

$(-\infty, -3) \cup (-3, \infty)$

State the transformation of the following functions.

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

① right 1

11) $g(x) = \frac{3}{x + 2} - 2$

① Left 2, Down 2

② Down 2

12) $h(x) = -\frac{4}{x} + 5$

① Reflect over the y-axis

② up 5

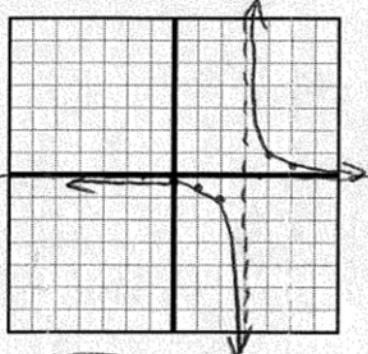
Sketch the graph.

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

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

x	y
-2	-1/2
-1	-1
0	und.
1	1
2	1/2

x+3	y
1	-1/2
2	-1
3	und.
4	1
5	1/2



VA: $x=3$

HA: $y=0$

x-intercept: none

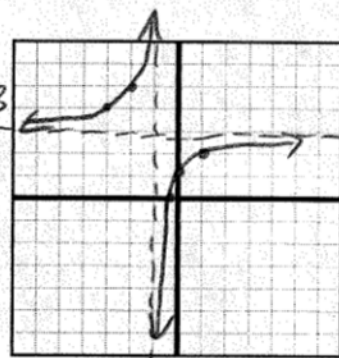
y-intercept: $-\frac{1}{3}$

14) $g(x) = -\frac{2}{x+1} + 3$

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

x	y
-2	-1
-1	-2
0	und.
1	2
2	1

x-1	-y+3
-3	4
-2	5
-1	und.
0	1
1	2



VA: $x=-1$

HA: $y=3$

x-intercept: $0 = -\frac{2}{x+1} + 3$

$$\begin{aligned} -3 &= -\frac{2}{x+1} \\ -3(x+1) &= -2 \\ -3x-3 &= -2 \\ -3x &= 1 \end{aligned}$$

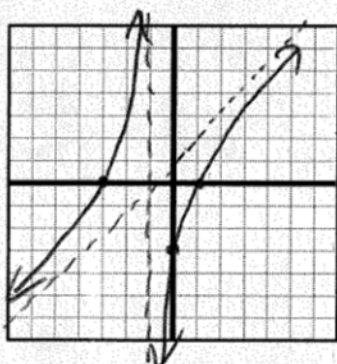
y-intercept:

$x = -\frac{1}{3}$

$$\begin{aligned} g(0) &= -\frac{2}{0+1} + 3 \\ &= -2 + 3 \end{aligned}$$

16) $g(x) = \frac{x^2-4}{x} = \frac{(x+2)(x-2)}{x}$

15) $g(x) = \frac{x^2+2x-3}{x+1} = \frac{(x+3)(x-1)}{x+1}$



y-intercept: $g(0) = \frac{3(-1)}{1} = -3$

x-intercept: $(x+3)(x-1) = 0$
 $x = -3, 1$

VA: $x=-1$

SA: $-1 \mid 1 \ 2 \ -3$
 $ -1 \ -1$
 $ 1 \ 1 \ \cancel{X}$
 $y = x+1$



y-intercept: $g(0) = \frac{2(-2)}{0} = \text{und.}$
none

x-intercept: $(x+2)(x-2) = 0$
 $x = -2, 2$

VA: $x=0$

SA: $0 \mid 1 \ 0 \ -4$
 $ 0 \ 0$
 $ 1 \ 0 \ \cancel{X}$
 $y = x$