

Quiz Rational Functions 2018 A

Name: Answers

1) Match each equation with its graph below.

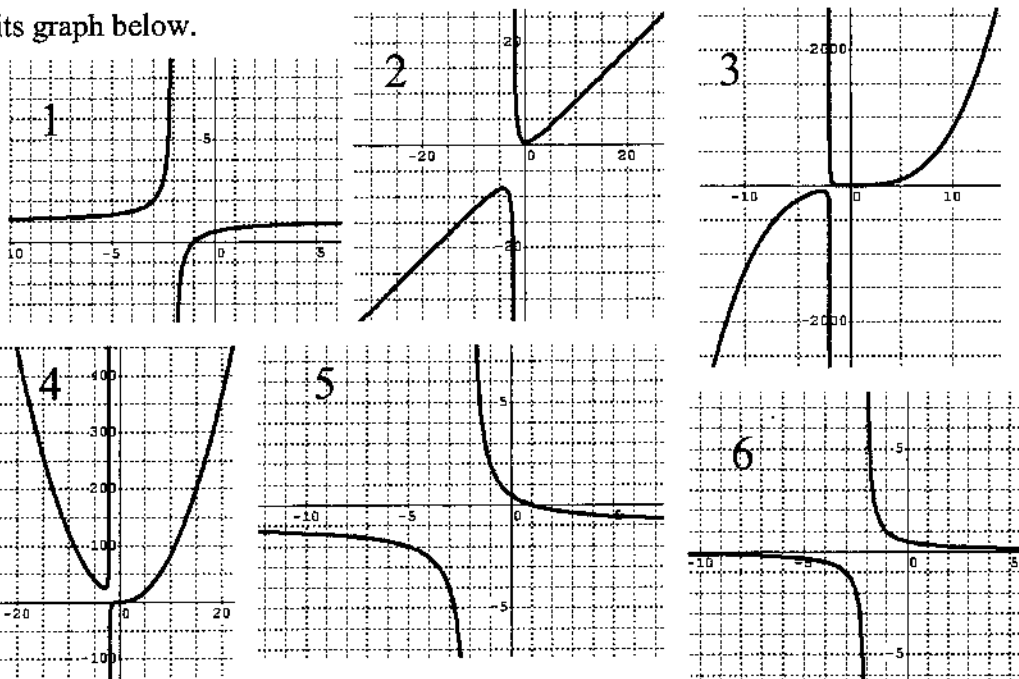
2 ✓ $f(x) = \frac{x^2 + 1}{x + 2}$

6 ✓ $g(x) = \frac{1}{x + 2}$

5 ✓ $h(x) = \frac{-x + 1}{x + 2}$

4 ✓ $j(x) = \frac{x^3 + 1}{x + 2}$

1 ✓ $k(x) = \frac{x + 1}{x + 2}$



2) For the functions below find the x and y intercepts and vertical and horizontal asymptotes.

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

y-intercept(s): 0 ✓ x-intercept(s): 0 ✓, $\frac{1}{4}$ ✓

Vertical asymptote(s): $x = \frac{1}{2}$ ✓, -1 ✓

Horizontal asymptote: $y = \underline{2}$ ✓

[6]

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

y-intercept(s): -1 ✓ x-intercept(s): $\frac{4}{3}$ ✓

Vertical asymptote(s): $x = \underline{-4}$ ✓, -1 ✓

Horizontal asymptote: $y = \underline{0}$ ✓

[5]

3) Given the following information about a rational function, make a sketch of the function.

$$y = \frac{-2x^2 + 8}{x^2 + 2x - 3}$$

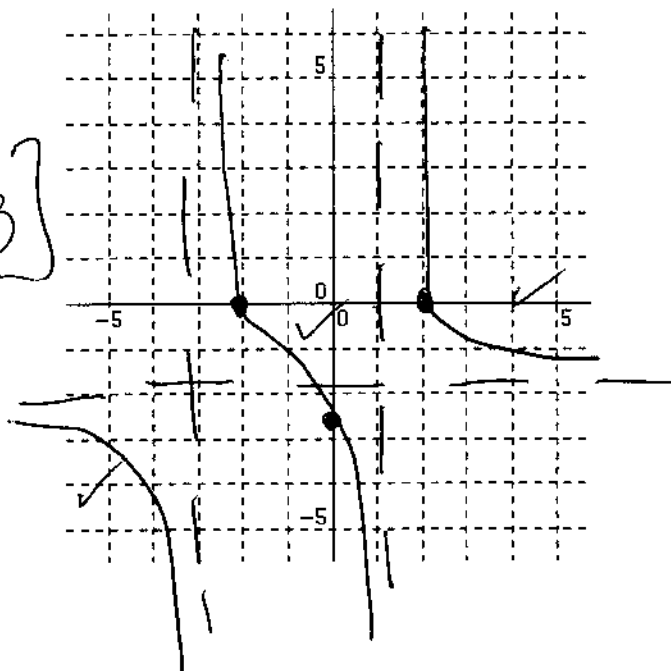
y-intercept: $y = -\frac{8}{3} = -2\frac{2}{3}$

x-intercepts: $x = -2, x = 2$

Vertical asymptotes: $x = -3, x = 1$

Horizontal Asymptote: $y = -2$

3



4) Given the following information about a rational function, make a sketch of the function.

$$y = \frac{3x^2 - 12}{3x^2 + 4}$$

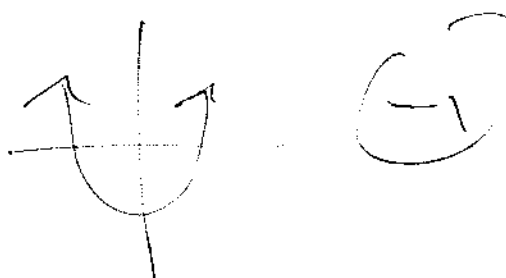
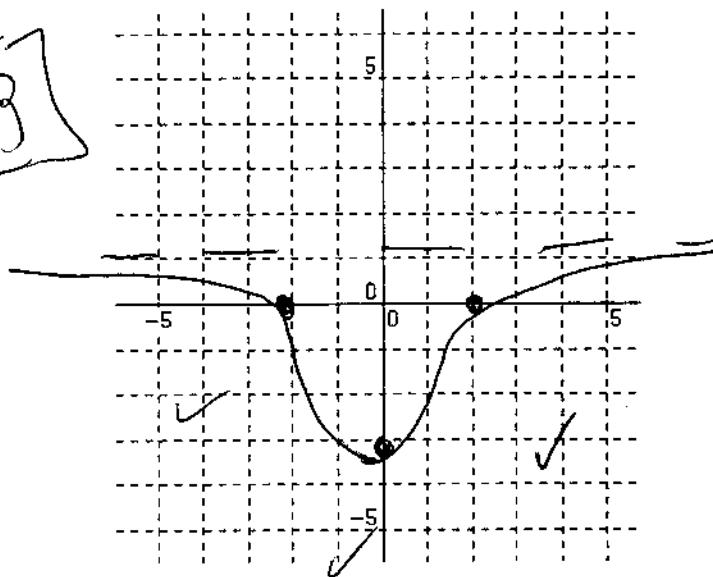
y-intercept: $y = -3$

x-intercepts: $x = -2, x = 2$

Vertical asymptotes: *none*

Horizontal Asymptote: $y = 1$

3



5) Find the equation of the slant asymptote of $h(x)$.

$$h(x) = \frac{6x^2 - 7x + 5}{2x - 1}$$

$$\begin{array}{r} 3x - 2 \checkmark \\ 2x - 1 \overline{) 6x^2 - 7x + 5} \checkmark \\ \underline{-(6x^2 - 3x)} \\ -4x + 5 \\ \underline{-(-4x + 2)} \\ 3 \end{array}$$

Slant asymptote: $y = 3x - 2$ ✓

[3]

6) Fill in the following information and sketch the function.

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

y-intercept(s): $\frac{1}{2}$ ✓

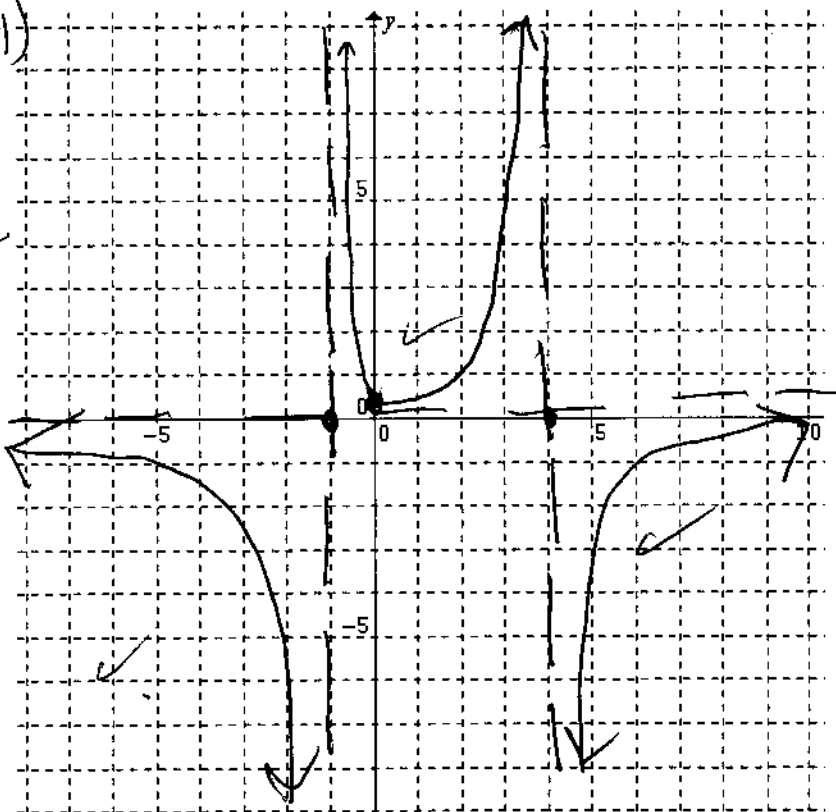
x-intercept(s): none ✓

Vertical asymptote(s): $x = 4, x = -1$ ✓

As $x \rightarrow \infty, f(x) \rightarrow 0$

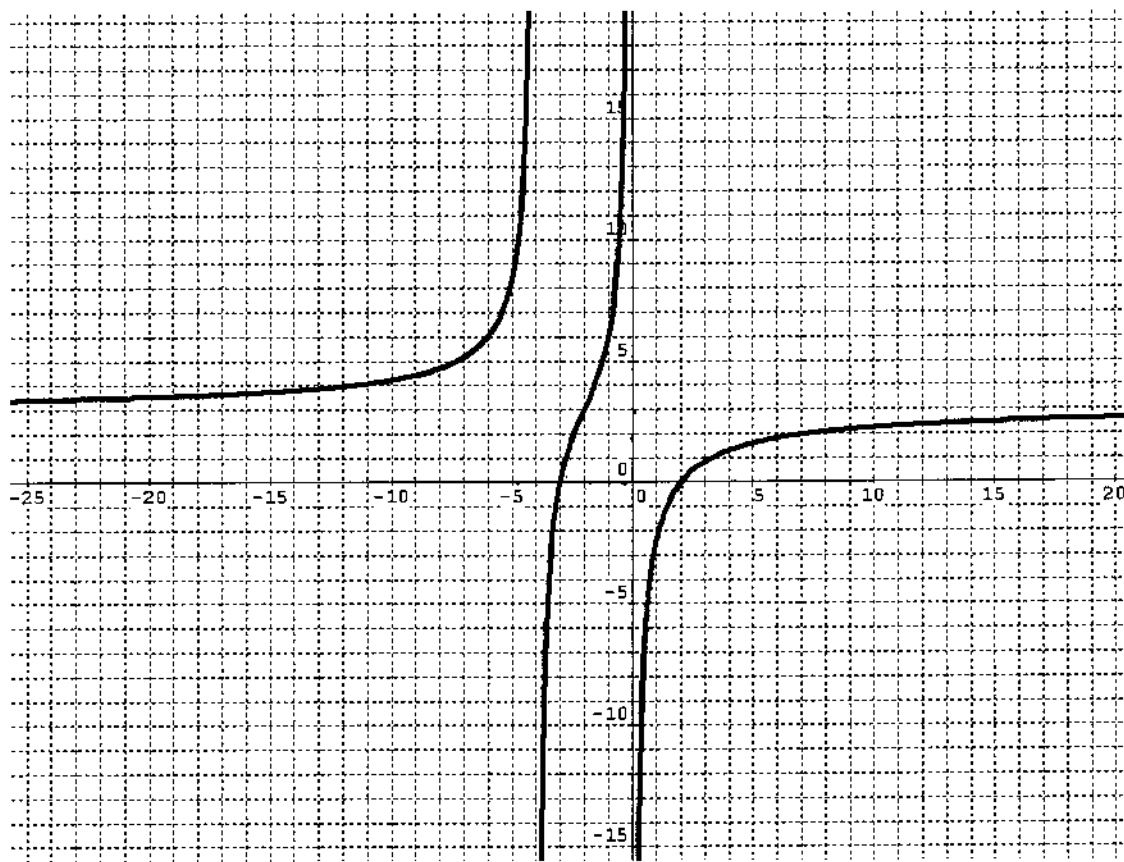
As $x \rightarrow -\infty, f(x) \rightarrow 0$

Horizontal or slant asymptote: $y = 0$ ✓



[8]

7) Find a possible equation for the rational function graphed below.



$$y = \frac{\cancel{3}(x+3)(x-2)}{\cancel{x}(x+4)} \Rightarrow \frac{\cancel{3}x^2 + 3x - 18}{x^2 + 4x} \quad [4]$$

8) Find all the roots of the polynomial: $x^4 - 5x^2 + 4 = 0$

$$(x^2 - 1)(x^2 - 4) = 0 \quad [2]$$

$$x = \pm 1, x = \pm 2$$