

Name: The real answers were the friends we made on the journey. Class: _____

Completely Graph a Rational Function HW (Lesson 3)

Analyze each rational function. Use algebra to determine the vertical asymptotes, a removable discontinuity, horizontal asymptotes and/or roots. Do not use a graphing calculator.

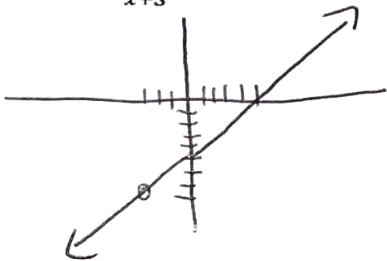
1. $f(x) = \frac{1}{(x+2)(x-3)}$ VA: $x=2, x=3$ RD: None HA: $y=0$ R: None

2. $f(x) = \frac{12x}{x^2 + 4x - 5}$ VA: $x=-5, 1$ RD: None HA: $y=0$ R: 0

3. $f(x) = \frac{x}{x^2 - x}$ VA: 1 RD: 0 R: None HA: $y=0$

For each rational function, find the vertical asymptotes & holes, as well as the horizontal asymptotes and roots. Then sketch the graph of the function.

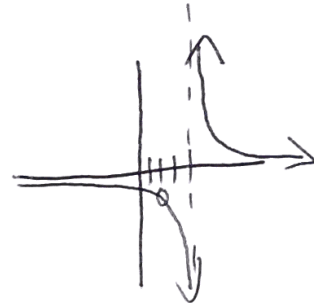
4. $y = \frac{x^2 - 2x - 15}{x + 3}$



VA: None
RD: -3
HA: None
R: 5

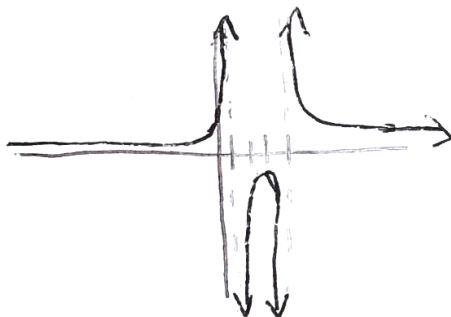
5. $y = \frac{3x - 6}{x^2 - 6x + 8}$

VA = 4
RD = 2
HA = $y=0$
R = None



6. $y = \frac{3}{x^2 - 5x + 4}$

VA: $x=4, 1$
RD: None
HA: $y=0$
R: None



7. $y = \frac{2x^2 + 10x + 12}{x^2 - 9}$

VA: $x=3$
RD: $x=-3$
HA: $y=1$
R: $x=-2$



Write an example of a rational function that models each of the given characteristics.

8. A removable discontinuity at $x = 8$

$$\frac{x-8}{x-8}$$

9. A vertical asymptote at $x = -3$ and $x = 5$

A removable discontinuity at $x = 1$

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

10. A vertical asymptote at $x = 0$

A removable discontinuity at $x = -2$

$$\frac{x+2}{x(x+2)}$$

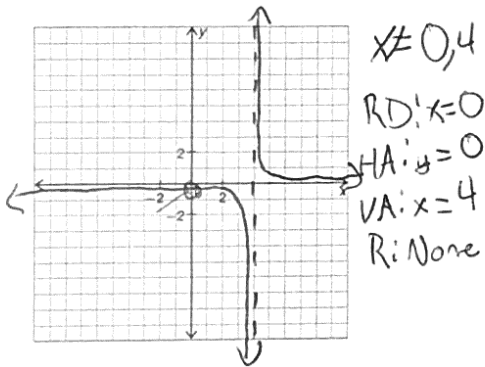
11. A vertical asymptote at $x = 3$

A removable discontinuity at $x = -1$ and $x = 4$

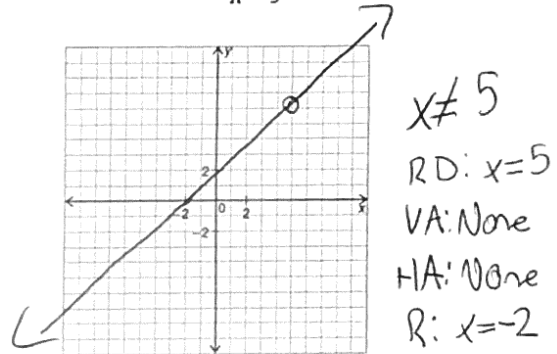
$$\frac{x-3}{(x-3)(x+1)(x-4)}$$

Sketch each rational function without using a graphing calculator. Identify any restrictions/discontinuities/asymptotes and roots.

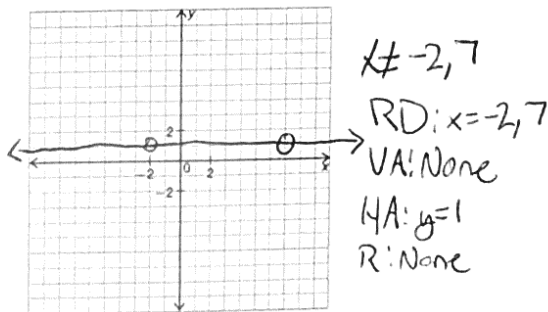
12. $f(x) = \frac{x}{x^2 - 4x}$



13. $f(x) = \frac{x^2 - 3x - 10}{x - 5}$



14. $f(x) = \frac{x^2 - 5x - 14}{x^2 - 5x - 14}$



15. $f(x) = \frac{x^2 - 5x - 6}{x - 6}$

