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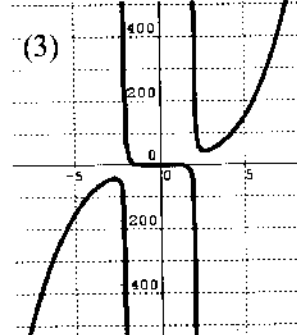
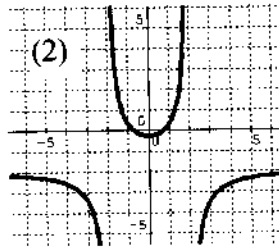
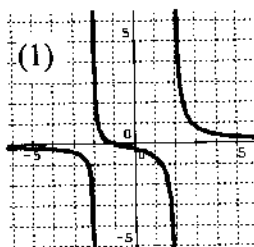
Answers

Quiz Rational Functions

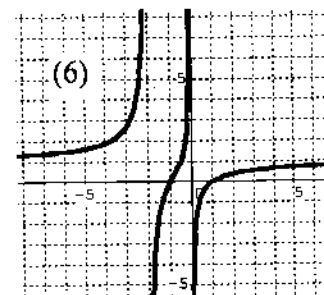
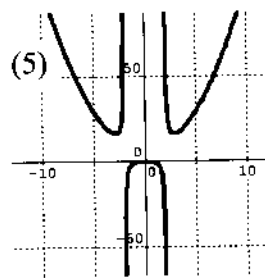
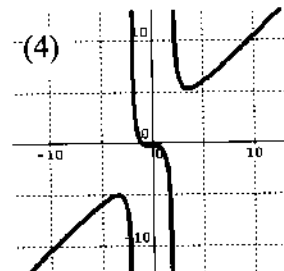
2017 v. 1

1) Match each equation below with its graph.

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



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



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

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

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

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

(a) $f(x) = \frac{2x^2-8}{x^2+2x-15}$

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

y-intercept(s): $\frac{8}{15}$

x-intercept(s): $2, -2$

Vertical asymptote(s): $-5, 3$

Horizontal or slant asymptote(s): $y = 2$

[4]

(b) $f(x) = \frac{6x}{x^2+3}$

y-intercept(s): 0

x-intercept(s): 0

Vertical asymptote(s): None

Horizontal or slant asymptote(s): 0

[4]

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

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

y-intercept: -3 x-intercepts: $x = 1$ and -3

Undefined when: $x = -1$

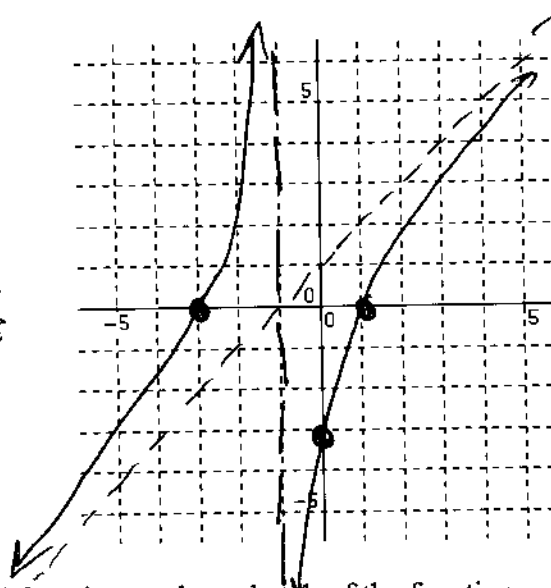
Vertical asymptote: $x = -1$

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

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

Slant asymptote: $y = x + 1$

(-1)
wrong
graph
of slant



[3]

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

$$y = \frac{x^2 - 9}{x^2 - 4}$$

y-intercept: $\frac{9}{4}$ x-intercepts: -3 and 3

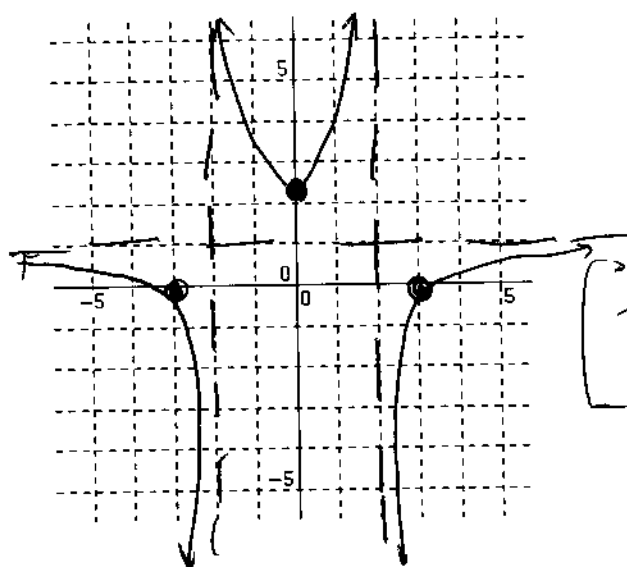
Undefined when: $x = -2, x = 2$

Vertical asymptote: $x = -2, x = 2$

As $x \rightarrow \infty$, $y \rightarrow 1$

As $x \rightarrow -\infty$, $y \rightarrow 1$

Horizontal asymptote: $y = 1$



[3]

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

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

$$\begin{array}{r} -x + 2 \\ x+1 \overline{) -x^2 + x + 3} \\ \underline{-(-x^2 - x)} \\ 2x + 3 \\ \underline{-2x + 2} \\ 1 \end{array}$$

$$y = -x + 2$$

[B]

-1
if
include
remainder

$$y = -x + 2$$

10

6) Use long division to divide $f(x)$. To get full credit for this problem, you must choose the

appropriate multiple-choice answer and show your work. $f(x) = \frac{2x^4 + 5x^2 - 7}{x^2 - 2x}$

a) $f(x) = 2x^2 + 4x + 13 + \frac{19x}{x^2 - 2x}$

b) $f(x) = 2x^2 + 9 + \frac{11x}{x^2 - 2x}$

c) $f(x) = 2x^2 - 4x + 13 + \frac{-26x - 7}{x^2 - 2x}$

d) $f(x) = 2x^2 + 4x + 13 + \frac{26x - 7}{x^2 - 2x}$

e) $f(x) = 2x^2 + 9 + \frac{18x - 7}{x^2 - 2x}$

[3]

$$\begin{array}{r}
 2x^2 + 4x + 13 \\
 \hline
 x^2 - 2x \overline{) 2x^4 + 0x^3 + 5x^2 + 0x - 7} \\
 \underline{-(2x^4 - 4x^3)} \\
 4x^3 + 5x^2 \\
 \underline{-(4x^3 - 8x^2)} \\
 13x^2 + 0x - 7 \\
 \underline{-(13x^2 - 26x)} \\
 26x - 7
 \end{array}$$

For question #7, fill in the following information and sketch the function.

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

y-intercept(s): $-\frac{1}{2}$ ✓ x-intercept(s): none ✓

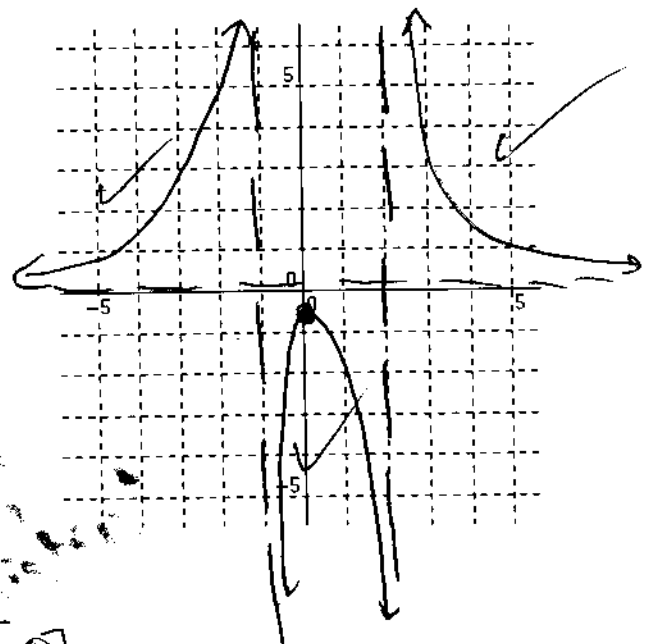
Undefined when: $x = 2, -1$ ✓

Vertical asymptote(s): $2, -1$ ✓

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

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

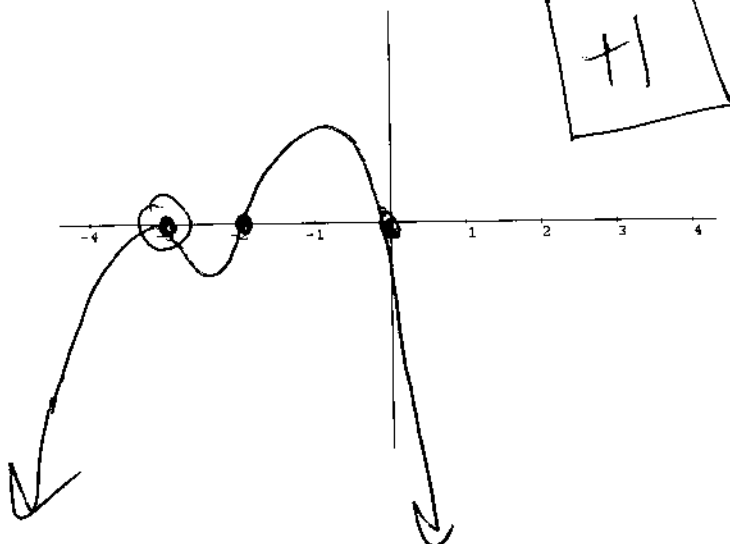
Horizontal or slant asymptote(s): 0 ✓



[10]

Bonus: Sketch the graph of the polynomial function $f(x)$.

$f(x) = -(x+2)(x+3)^2(x)$

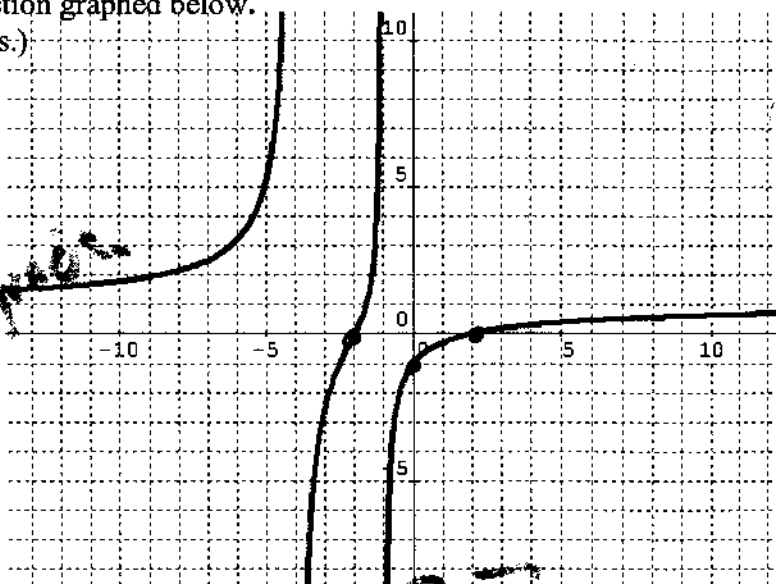


[+1]

- 8) Find a possible equation for the rational function graphed below.
(Note: All intercepts and asymptotes are integers.)

$x\text{-int: } \pm 2$
 $y\text{-int} = -1$
 $\text{horiz: } y = 1$
 $\text{vertical: } x = -4, x = -1$

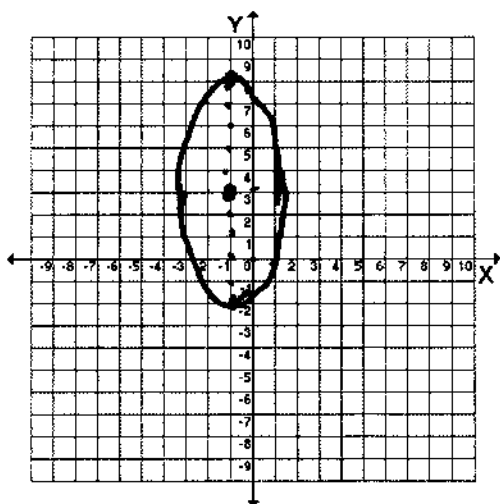
$y = \frac{(x-2)(x+2)}{(x+4)(x+1)}$
 $\text{or } y = \frac{x^2 - 4}{x^2 + 5x + 4}$



[3]

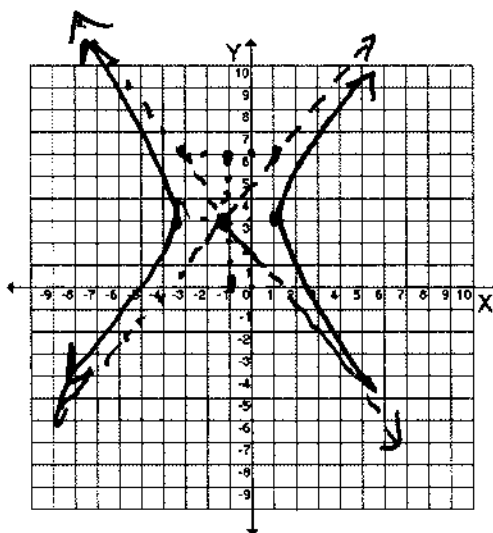
- 9) Graph each conic section below:

a) $\frac{(x+1)^2}{4} + \frac{(y-3)^2}{25} = 1$



[3]

b) $9x^2 + 18x - 4y^2 + 24y - 63 = 0$



$9(x^2 + 2x + 1) - 4(y^2 - 6y + 9) = 63$
 $9(x+1)^2 - 4(y-3)^2 = 36$

$9(x^2 + 2x + 1) - 4(y^2 - 6y + 9) = 63$
 $9(x+1)^2 - 4(y-3)^2 = 36$
 $\frac{(x+1)^2}{4} - \frac{(y-3)^2}{9} = 1$

[4]