

Honors PreCalculus '20-21

Name: _____

Dr. Quattrin

Rational Functions Test v1

CALCULATOR ALLOWED

Score _____

Round to 3 decimal places. Show all work.

1. The equation of the line normal to the graph of $y = \frac{x}{2x-3}$ at the point $(1, f(1))$ is

(a) $3x + y = 4$

(b) $3x + y = 2$

(c) $x - 3y = -2$

(d) $x - 3y = 4$

(e) $x + 3y = 2$

2. $\lim_{x \rightarrow \infty} \frac{4x^5 + 3x^4 + 2x^3 + x^2 + 1}{3x^6 - 9x^4 + 4x^3 + 15} =$

a) 0

b) $\frac{3}{4}$

c) $\frac{4}{3}$

d) 3

e) DNE

Let $f(x)$ and $g(x)$ be differentiable functions. The table below gives the values of $f(x)$ and $g(x)$, and their derivatives, at several values of x .

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
0	-5	-1	6	1
1	-5	1	6	-1
2	-3	3	4	-3

Find $\frac{d}{dx} \left[\frac{f(x)}{g(x)} \right]$, when $x = 0$.

- a) $\frac{7}{36}$ b) $-\frac{5}{36}$ c) $\frac{5}{36}$ d) $\frac{1}{36}$ e) $-\frac{1}{36}$
-

4. Which of the following functions has a slant asymptote with a positive slope?

a) $y = \frac{x^3 - 5x^2 - 2x + 24}{2x^2 + 7x - 15}$

b) $y = \frac{2x^3 - 9x^2 + 7x + 6}{6 - x - x^2}$

c) $y = \frac{x^3 - 8}{x^4 - 13x^2 + 36}$

d) $y = \frac{x^2 - 1}{x^2 + 2x - 3}$

e) $y = \frac{1 - x^2}{x^2 + 2x - 3}$

5. Suppose $f'(x) = \frac{(x+4)^3(x-2)^2}{(x^4+1)}$. Which of the following statements must be

true?

- I. The slope of the line tangent to $y = f(x)$ at $x = 1$ is 125.
- II. $f(x)$ is decreasing on $x \in (-4, 2)$
- III. $f(x)$ has a minimum at $x = -4$

- a) I only b) II only c) III only
- d) II and III only e) I, II and III
-

6. If $y = \frac{5x-4}{4x-5}$, then $\frac{dy}{dx} =$

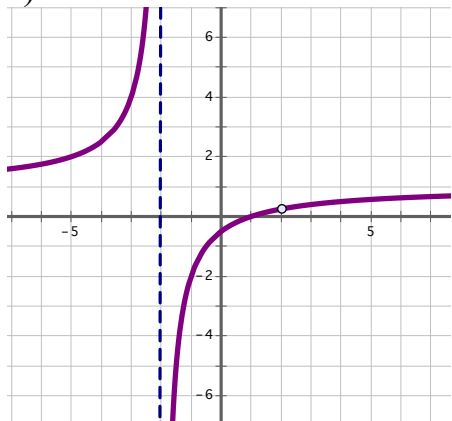
- a) $\frac{-9}{(4x-5)^2}$ b) $\frac{9}{(4x-5)^2}$ c) $\frac{40x-41}{(4x-5)^2}$
- d) $\frac{40x+41}{(4x-5)^2}$ e) $\frac{5}{4}$
-

7. The POE(s) of $y = \frac{x^2 + 2x - 3}{x^2 + 5x + 6}$ is/are at

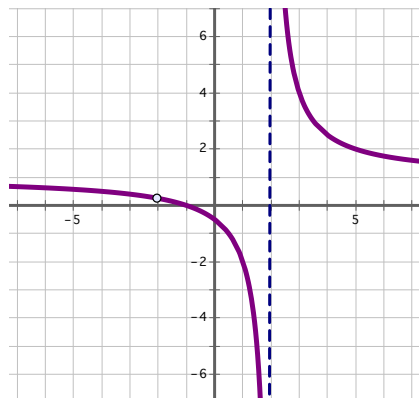
- a) $x = 1$ b) $x = -3$ c) $x = 1 \text{ \& } -3$
- d) $x = -2$ e) $x = -2 \text{ \& } -3$
-

8. Which of the following graphs match the equation $y = \frac{x^2 + 3x + 2}{x^2 - 4}$?

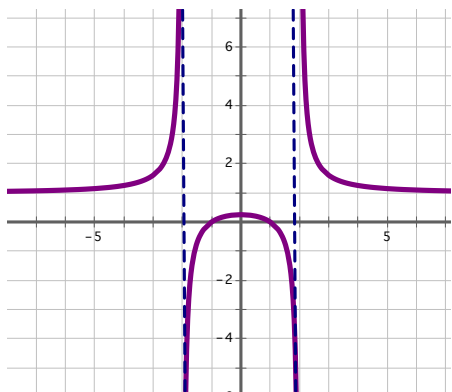
a)



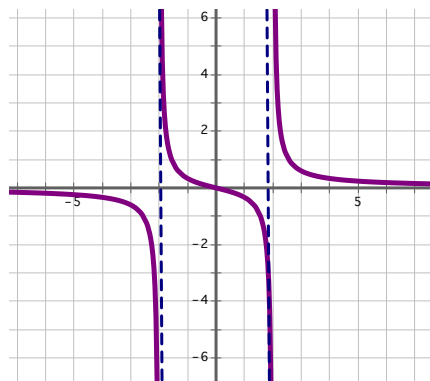
b)



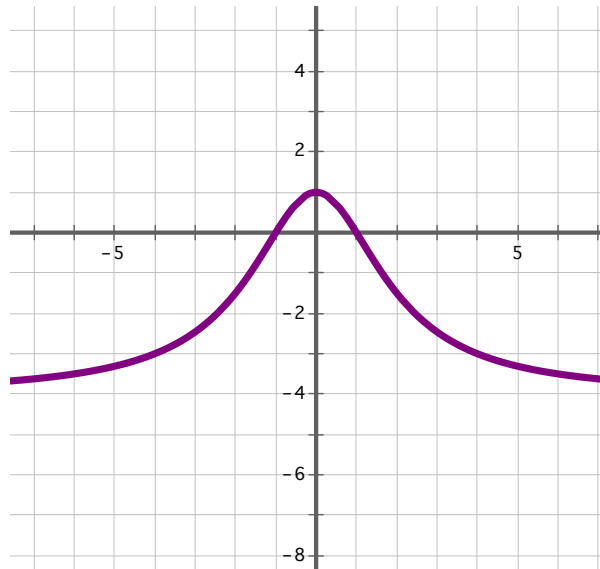
c)



d)



9. Which of the following equations match this graph?



a) $y = \frac{4x}{x^2 + 4}$

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

c) $y = \frac{4x^2 - 4}{x^2 + 4}$

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

Honors PreCalculus '20-21

Dr. Quattrin

Rational Functions Test v1

CALCULATOR ALLOWED

Round to 3 decimal places.

Show all work.

Name: _____

Score _____

1. Find asymptotes, POEs, and zeros of $y = \frac{x^3 - 5x^2 + 6x - 30}{x^2 - 8x + 15}$. Show the algebraic work to support the zeros.

2. Apply the First Derivative Test to $y = \frac{x^3 - 5x^2 + 6x - 30}{x^2 - 8x + 15}$, and Find the extreme points.

3. $\frac{d}{dx} \left[\frac{x^2 - 5x + 6}{x^2 + 6x + 8} \right]$

4. Find the zeros, VAs, POEs and EB of $y = \frac{9 - x^2}{x^2 - 4}$ on $x \in [-1, 5]$. Show the derivative and algebra to support the critical values.

Zeros:

VAs:

POE:

End Behavior (left):

End Behavior (right):

5. Find the Extreme Points of $y = \frac{9-x^2}{x^2-4}$ on $x \in [-1, 5]$. Show the derivative and algebra to support the critical values.

Honors PreCalculus '20-21

Name: _____

Dr. Quattrin

Rational Functions Test v1

NO CALCULATOR ALLOWED

Score _____

Show all work.

6. Write an equation of a rational function that has x -intercepts at $(-6, 0)$, VA at $x = 6$, a POE at $x = 3$, and a HA at $y = \frac{9}{4}$.

7. Show the sign pattern and solve $\frac{x^2 - 5x + 6}{x^2 + 6x + 8} \leq 0$.

8. Find the traits and **sketch** $y = \frac{9-x^2}{x^2-4}$ on $x \in [-1, 5]$.

Domain:

Range:

Y-Int:

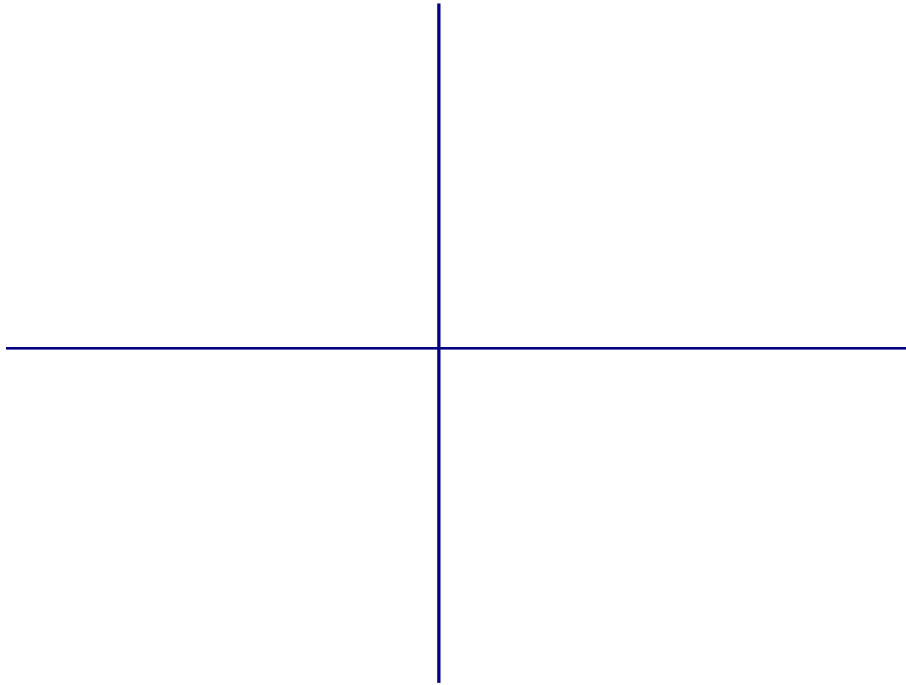
End Behavior:

Vas:

POEs:

Zeros:

Extreme Values:



9. Find the traits and **sketch** of $y = \frac{x^3 - 5x^2 + 6x - 30}{x^2 - 8x + 15}$.

Domain:

Range:

Y – Int:

End Behavior:

Zeros:

Extreme Values:

POEs:

VAs:

