

PreCalculus Honors

Name: _____

Dr. Quattrin

Rational Functions Test

CALCULATOR ALLOWED

Score _____

Round to 3 decimal places. Show all work.

1. What is $f'(1)$ if $f(x) = \frac{x^2 + 8}{7x}$?

- (a) $-\frac{1}{49}$ (b) $\frac{15}{49}$ (c) -1 (d) $\frac{15}{7}$ (e) $\frac{16}{7}$

2. The equation of the line tangent to the graph of $y = \frac{3x+4}{4x-3}$ at the point (1,7) is

- (a) $y = -25x + 32$ (b) $y = 31x - 24$ (c) $y = 7x$
(d) $y = 5x + 12$ (e) $y = 25x - 18$

3. A function is defined as $g(x) = \frac{(x-4)^2}{x-7}$. Which of the following is **false**?

- (a) $g(x)$ is increasing for $x > 7$.
(b) $g(x)$ is decreasing on $[4, 7]$.
(c) $g(x)$ has a local maximum at $x = 4$.
(d) $g(x)$ has a horizontal asymptote at $y = 1$.
(e) $g(x)$ has a vertical asymptote at $x = 7$.

4. 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	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	3	2	4	-6
2	1	8	-5	7
3	7	-2	7	9

If $h(x) = \frac{f(x)}{g(x)}$, what is the value of $h'(2)$?

- a) -4 b) -63 c) 51 d) $-\frac{47}{64}$ e) $-\frac{33}{64}$

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

- I. The slope of the line tangent to $y = f(x)$ at $x = 2$ is -8 .
 II. $f(x)$ is increasing on $x \in (1, 4)$
 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. An equation of the line tangent to the curve $y = \frac{kx+8}{k+x}$ at $x = -2$ is $y = 2x + 4$. What is the value of k ?

- a) -4 b) -2 c) 0 d) 2 e) 4

7. If $y = \frac{2x+3}{2-3x}$, then $\frac{dy}{dx} =$

- a) $\frac{-12x-2}{(2-3x)^2}$ b) $\frac{-12x+2}{(2-3x)^2}$ c) $\frac{13}{(2-3x)^2}$
d) $\frac{-13}{(2-3x)^2}$ e) $-\frac{2}{3}$

8. $\lim_{x \rightarrow \infty} \frac{5x^3 - x^2 + 20x - 4}{5x^2 - 11x + 2}$

- a) 0 b) 1 c) -2 d) 5 e) ∞

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1. Find asymptotes, POEs, and zeros of $y = \frac{5x^3 - x^2 + 20x - 4}{5x^2 - 11x + 2}$. Show the algebraic work to support the zeros. Find the extreme points graphically, but show the algebraic work to support the critical values.

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

3. Find all asymptotes, zeros, POEs, and Extreme Points of $y = \frac{16 - x^2}{x^2 - 4}$. Show the derivative and algebra to support the critical values.

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Rational Functions Test – NO CALCULATOR ALLOWED

Show all work.

4. Write an equation of a rational function that has x -intercepts at $(-3, 0)$, VA at $x = 5$, a POE at $x = -2$, and a HA at $y = \frac{6}{5}$.

5. Find the traits and **sketch** $x^2y + x^2 - 4y - 16 = 0$.

Domain:

Range:

 Y – Int:

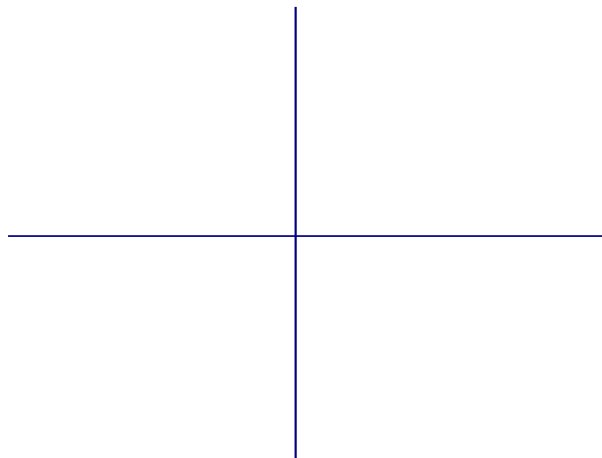
End Behavior:

Vas:

POEs:

Zeros:

Extreme Values:



6. Find the traits and **sketch** of $y = \frac{5x^3 - x^2 + 20x - 4}{5x^2 - 11x + 2}$ on $x \in [0, 7]$.

Domain:

Range:

Y – Int:

End Behavior:

Zeros:

Extreme Values:

POEs:

VAs:

