

Round to 3 decimal places. Show all work.

1. An equation of the line normal to the graph of $y = \frac{2x+3}{3x-2}$ at $(1, 5)$ is

- a) $13x - y = 8$
 - b) $13x + y = 18$
 - c) $x - 13y = -64$
 - d) $x + 13y = 66$
 - e) $-2x + 3y = 13$
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2. A function is defined as $g(x) = \frac{kx}{x^2+1}$, where k is a constant. For what values of k , if any, is f strictly increasing on the interval $(-1, 1)$?

- (a) $k < 0$
 - (b) $k > 0$
 - (c) $k > 1$ only
 - (d) $-1 < x < 1$
 - (e) No such Values of k
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3. 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 $h'(3)$?

- a) -4 b) $\frac{11}{7}$ c) 1 d) $-\frac{77}{4}$ e) $\frac{49}{4}$
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4. Suppose $f'(x) = \frac{(x+1)^3(x-4)^2}{(x^4+1)}$. Which of the following statements must be true?

- I. The slope of the line tangent to $y = f(x)$ at $x = 1$ is 36.
- 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) I and II only (e) I, II and III
-

5. A particle moves along the x -axis at that its position at any time $t \geq 0$ is given by $x(t) = \frac{t}{4+t^2}$. The particle is at rest at $t =$

- a) 0 b) $\frac{1}{4}$ c) 1 d) 2 e) 4
-

6. If $y = \frac{1-x}{x-1}$, then $\frac{dy}{dx} =$

- a) -1 b) 0 c) $\frac{-1}{x-1}$ d) $\frac{-2}{x-1}$ e) $\frac{-2x}{(x-1)^2}$
-

7. $\lim_{x \rightarrow \infty} \frac{2x^2 - 5x + 3}{2x^3 + 5x^2 - 4x - 12} =$

- a) 0 b) 1 c) 2 d) $-\frac{1}{4}$ e) DNE
-

PreCalculus Honors '15-16

Name: _____

Dr. Quattrin

Rational Functions Test -- CALCULATOR ALLOWED

Round to 3 decimal places.

Score _____

Show all work.

1. Find asymptotes, POEs, and zeros of $y = \frac{3x^3 - x^2 + 12x - 4}{3x^2 - 7x + 2}$. Show the algebraic work to support the zeros.

2. Find the extreme points of $y = \frac{3x^3 - x^2 + 12x - 4}{3x^2 - 7x + 2}$ graphically, but show the algebraic work to support the critical values.

3. $\frac{d}{dx} \left[\frac{4x^2 - 16x}{x^3 - 4x^2 - x + 4} \right]$

4. Find the Extreme Points of $y = \frac{-6x}{x^2 + 9}$ on $x \in [-4, 4]$. Show the derivative and algebra to support the critical values.

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Rational Functions Test – NO CALCULATOR ALLOWED

Show all work.

5. 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 $y = \frac{6}{5}$.

6. Show the sign pattern and solve $\frac{4x^2 - 16x}{x^3 - 4x^2 - x + 4} > 0$.

7. Find the traits and **sketch** $y = \frac{-6x}{x^2 + 9}$ on $x \in [-4, 4]$.

Domain:

Range:

Y-Int:

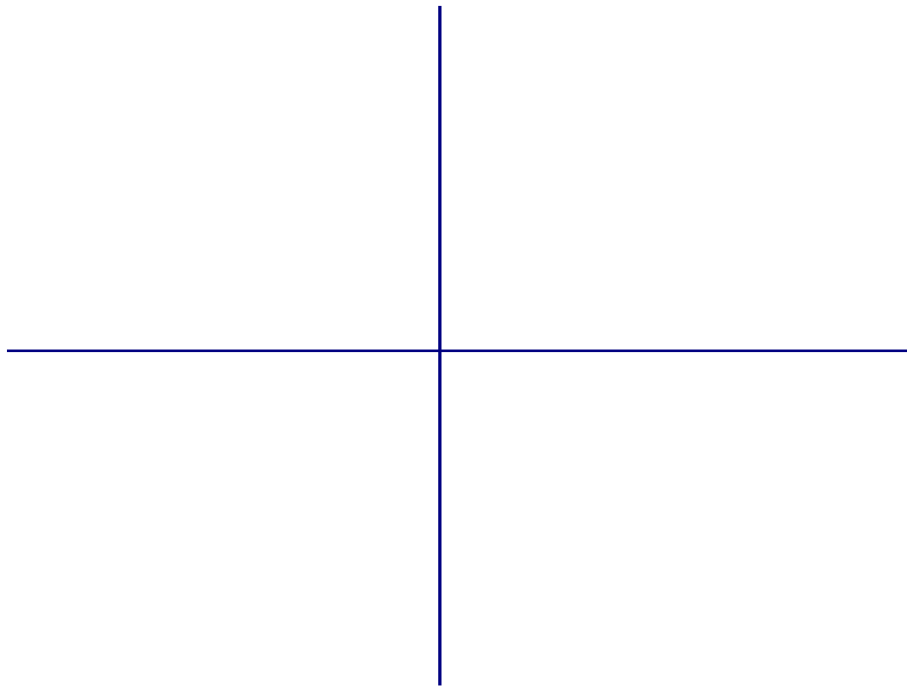
End Behavior:

Vas:

POEs:

Zeros:

Extreme Values:



8. Find the traits and **sketch** of $y = \frac{3x^3 - x^2 + 12x - 4}{3x^2 - 7x + 2}$.

Domain:

Range:

Y – Int:

End Behavior:

Zeros:

Extreme Values:

POEs:

VAs:

