

PreCalculus '13-14
Take-Home Midterm
Dr. Quattrin

Name: _____

Score _____

CALCULATOR ALLOWED

Round to 3 decimal places. Show all work.

1. Find the equations of the lines tangent and normal to

$$y = \frac{1}{4}x^4 + \frac{1}{3}x^3 + 2x^2 + 2x - 7 \text{ at } x = -1.$$

2. Find all zeros, algebraically, of $f(x) = -x^4 + x^3 + 41x^2 - 105x$.

3. Find an inequality that has this sign pattern and solution:

$$\begin{array}{c} y \\ x \end{array} \leftarrow \begin{array}{ccccccccc} + & 0 & - & 0 & - & 0 & + & 0 & + & 0 & - \\ & -5 & & -2 & & \frac{1}{2} & & 7 & & 13 & \end{array} \rightarrow$$

$$\text{and } x \in (-\infty, -5] \cup \{-2\} \cup [.5, 13]$$

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. Solve this inequality: $0 \leq \frac{(x-2)(x+2)(2x-7)}{(x+3)(x-2)(x+1)}$.

6. Find the extreme values of $y = \frac{1}{2}x^4 - x^3 - 9x^2 + 27x$, algebraically.

7. Find VAs, HA, POEs and zeros of $y = \frac{6x^3 - 11x^2 - 3x + 2}{x^4 - x^2 - 12}$

8. Find all the asymptotes and zeros of $y = \frac{x^2 - 16}{x^2 - 7}$

9. Find the extremes of $y = \frac{x^2 - 16}{x^2 - 7}$ algebraically.

10. List all the traits and sketch $y = \frac{6x^3 - 11x^2 - 3x + 2}{x^4 - x^2 - 12}$

Domain:

Range:

X-Intercepts:

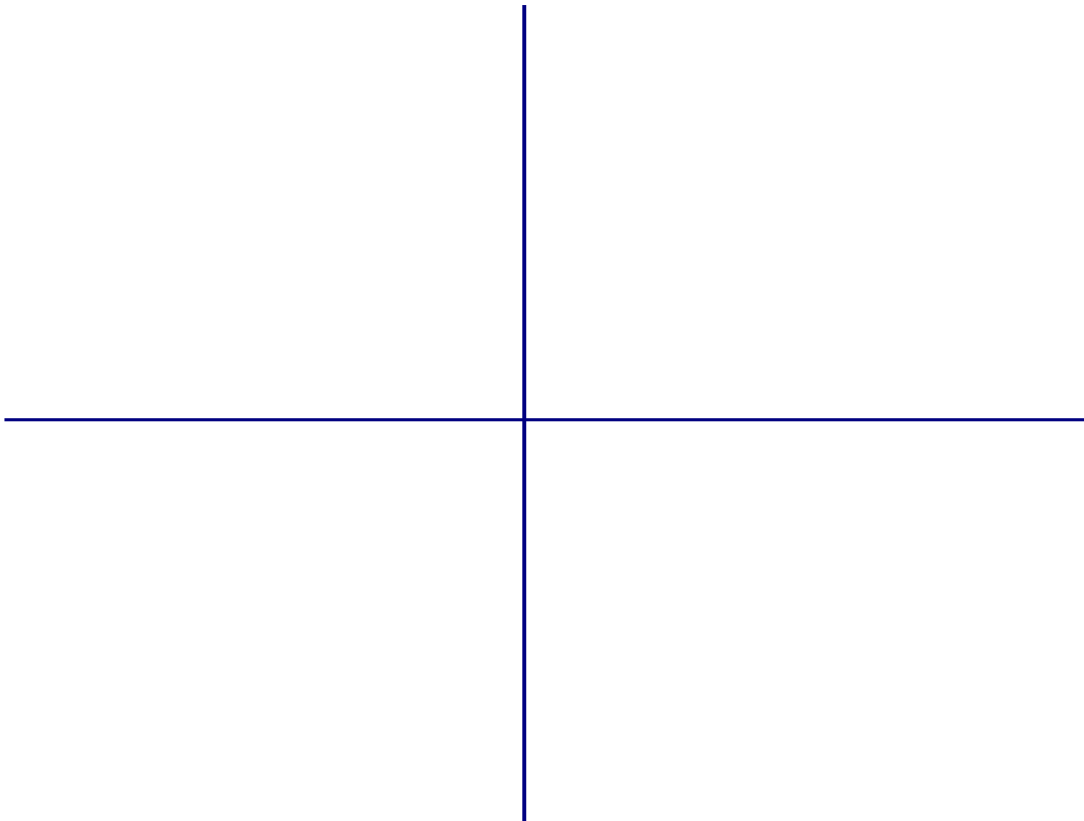
Y-Intercepts:

VAs:

POEs:

End Behavior:

Extremes:



11. List all the traits and sketch $y = \frac{x^2 - 16}{x^2 - 7}$

Domain:

Range:

X-Intercepts:

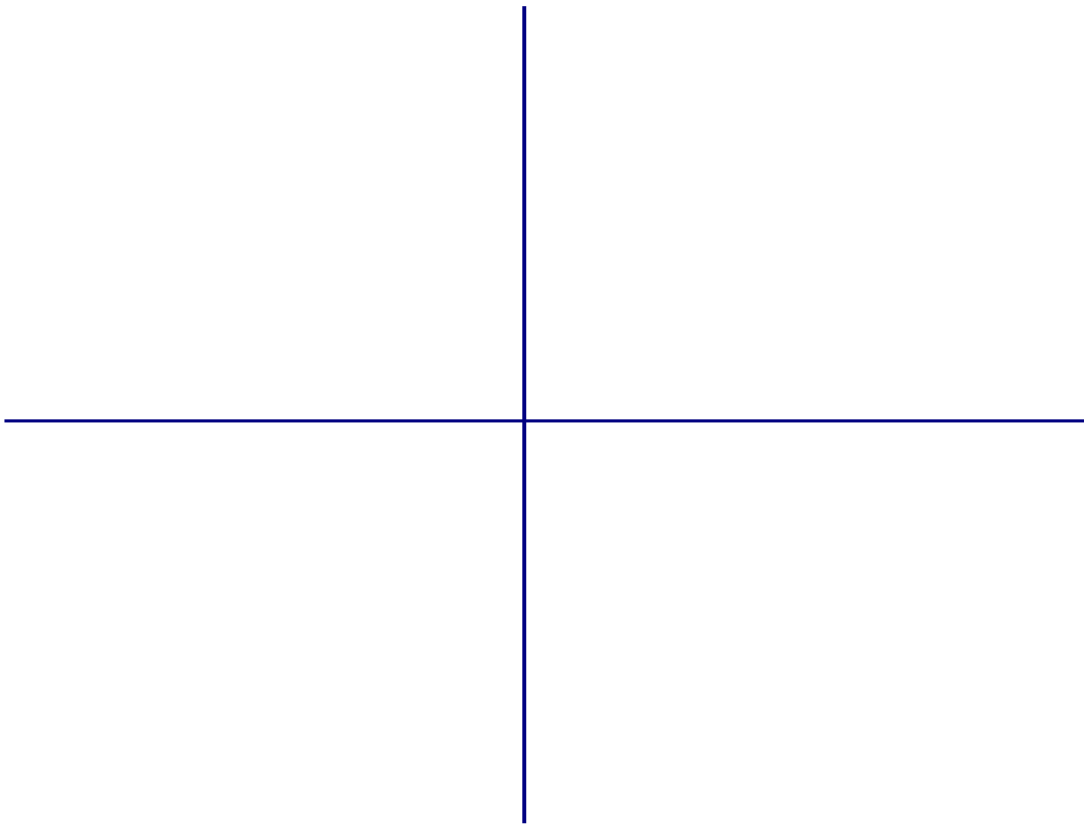
Y-Intercepts:

VAs:

POEs:

End Behavior:

Extremes:



12. List all the traits and sketch $f(x) = -x^4 + x^3 + 41x^2 - 105x$ on

Domain:

Range:

X-Intercepts:

Y-Intercepts:

VAs:

POEs:

End Behavior:

Extremes:

