NAME: _____ REVIEW #4
APPLICATIONS
DATE: _____ JCC MAT 1710

1. Given $f(x) = \dfrac{2(x^2 - 9)}{x^2 - 4}$
   a. Find the vertical asymptote(s) algebraically.
   b. Find the horizontal asymptote(s) algebraically.

2. Given $f(x) = \dfrac{x + 2}{x^2 - 3x - 10}$
   a. There is a point missing on the graph of the given function. Find the coordinates of the "hole" analytically. Show all work.
   b. A vertical asymptote exists in the graph of the given function. Verify this analytically showing all work.
   c. A horizontal asymptote also exists in the graph of the given function. Verify this analytically showing all work.

3. Find the equation of the tangent line and the normal line to the graph of the equation at the indicated point.
   $y = (x + 3)^3$ (-2, 1)

4. Find the equation of the line that is tangent to the graph of the equation and parallel to the given line.
   $f(x) = x^{-\frac{1}{2}}$ $x + 2y - 6 = 0$

5. Find the value(s) of x for all points on the graph of $f(x) = x^3 - 3x$ that have horizontal tangent lines.

6. A particle moves along the curve given by $y = \sqrt{t^3 + 1}$. Find the acceleration when $t = 2$ seconds.

7. Given: $y = 3x^4 - 6x^2$
   a. Find the first derivative.
   b. Find all critical numbers and determine the intervals where the function is increasing and decreasing.
   c. Find the second derivative and any relative maxima or minima.
   d. Use the second derivative to determine the graph's concavity.

Analyze and sketch the graph of the function. Label any intercepts, relative extrema, points of inflection, and asymptotes.

8. $y = x^3 - 3x^2 + 3$

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

$f(x)$ =

$f'(x)$ =

$f''(x)$ =

x-intercepts:

y-intercepts:

domain:

vertical asymptotes:

horizontal asymptotes:

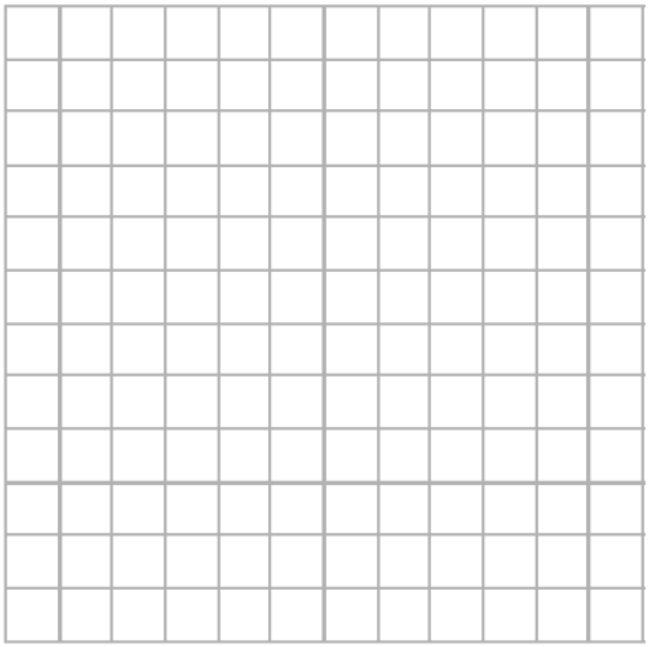
symmetry:

critical numbers:

possible points of inflection:

	$f(x)$	$f'(x)$	$f''(x)$	Characteristics

List all relative maximums, relative minimums and points of inflection:



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x-intercepts:

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domain:

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List all relative maximums, relative minimums and points of inflection: