

Round to 3 decimal places. Show all work.

1. Let  $f(x)$  be the function with  $f(1) = 2$  and  $f'(x) = \sqrt{x^2 + 3}$ . Using the tangent line approximation to the graph of  $f(x)$  at  $x=1$ , estimate  $f(1.02)$ .

- a. 2.01      b. 2.02      c. 2.03      d. 2.04      e. 2.05

2. Use Implicit Differentiation to find the points on  $x^3 - y^2 + x^2 = 0$  has vertical tangent lines.

(0, 0) only

(-1, 0) only

$(1, \sqrt{2})$  only

(-1, 0) and (0, 0)

The tangent line is never vertical

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

- (a) 0      (b)  $\frac{3}{4}$       (c)  $\frac{4}{3}$       (d) 3      (e) DNE

4. The y-intercept of the tangent line to the curve  $y = \sqrt{x+3}$  at the point  $(1, 2)$  is

- (a)  $\frac{1}{4}$       (b)  $\frac{1}{2}$       (c)  $\frac{3}{4}$       (d)  $\frac{5}{4}$       (e)  $\frac{7}{4}$

5. The line normal to  $3x^2 + y^2 + 4y = 5$  is horizontal at
- (a)  $x = -3$       (b)  $x = -2$       (c)  $x = 0$       (d)  $x = 2$       (e)  $x = 3$

6. Given the functions  $f(x)$  and  $g(x)$  that are both continuous and differentiable, and that have values given on the table below.

$x$	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
2	4	-2	8	1
4	8	8	4	3
8	6	-12	2	4

Given that  $h(x) = g(f(x))$ ,  $h'(4) =$

- (a) 32      (b) 10      (c) -6      (d) 24      (e) 16

7. Find the maximum value of  $f(x) = 2x^3 + 3x^2 - 12x + 4$  on the closed interval  $[0, 2]$ .

- a) -3      b) 0      c) 2      d) 4      e) 8

8. At what approximate rate (in cubic meters per minute) is the volume of a sphere changing at the instant when the surface area is 3 square meters and the radius is increasing at the rate of  $1/5$  meters per minute?

- (a) 1.228      (b) 1.905      (c) 0.649      (d) 0.600      (e) 0.62016

PreCalculus Honors

Name: \_\_\_\_\_

Dr. Quattrin

Radical Test-- CALCULATOR ALLOWED

Round to 3 decimal places.

Score \_\_\_\_\_

Show all work.

1. Find the zeros, critical values, and extreme values of  $y = -\sqrt{-3x^3 + 5x^2 + 48x - 80}$ . Show the algebraic work, including sign patterns where necessary, to support the zeros and critical values.

Zeros:

Critical Values:

Extreme Values:

2. Find the zeros, VAs, POEs, critical values, and extreme values of  $y = \sqrt{\frac{x-2}{x^3-4x}}$ . Show the derivative and algebra to support the critical values.

Zeros:

VAs:

Critical Values:

POEs:

Extreme Values:

3a.  $\frac{d}{dx} \left[ (7x^2 - 2x)^{17} \right]$

3b.  $\frac{d}{dx} \left[ \sqrt[5]{5x^2 - 10x + 1} \right]$

PreCalculus Honors

Name: \_\_\_\_\_

Dr. Quattrin

Polynomials Test—CALCULATOR NOT ALLOWED

Show all work.

Score \_\_\_\_\_

4. Find the traits and **sketch**  $y = -\sqrt{-3x^3 + 5x^2 + 48x - 80}$ .

Domain:

Range:

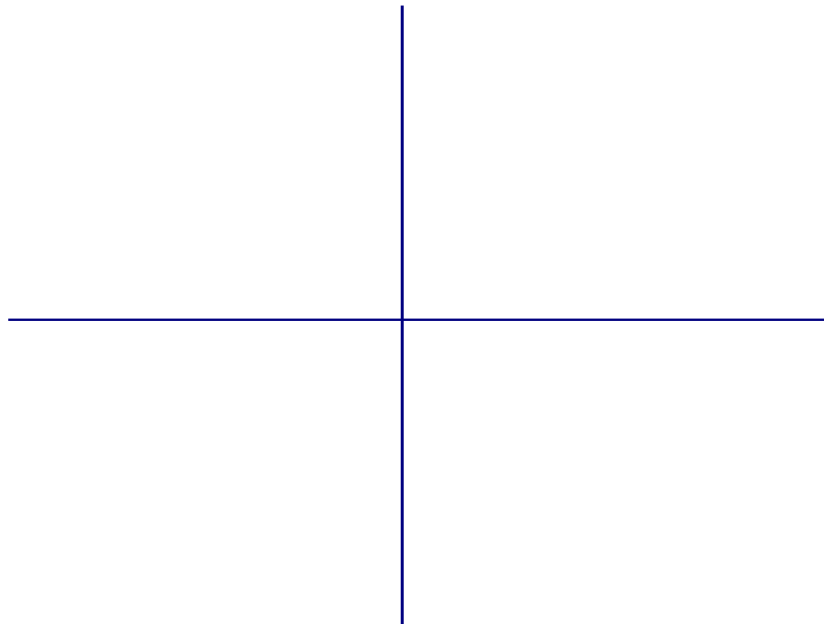
Y – Int:

Zeros:

Extreme Points:

End Behavior (Right):

End Behavior (Left):



5. List the traits and **sketch** of  $y = \sqrt{\frac{x-2}{x^3-4x}}$  on  $x \in [-4, 4]$ .

Domain:

Range:

Y – Int:

VAs:

Zeros:

Extreme Points:

End Behavior (Right):

End Behavior (Left):

