

MATH 165

TEST 3

Name: _____

SHOW ALL WORK

1. (6 points) Find $\frac{dx}{dt}$ for $x = -2z - t^3$

2. (10 points) Find $\frac{dy}{dx}$ for $3x^2 + 5xy^2 = 2y + 5$

3. (8 points) Find the differential dy for $y = 4x^2 + \frac{1}{x}$

4. Use the equation $y = 3x^2 - 4x - 5$ to answer the following questions.

a) (10 points) Write the equation of the tangent line drawn to this curve at $x = 2$. Answer in general form.

b) (2 points) Find the slope of the normal line drawn to this curve at $x = 2$.

5. Use the equation $y = -x^3 + 6x^2$ to answer the following questions.

a) (2 points) Find the domain of y .

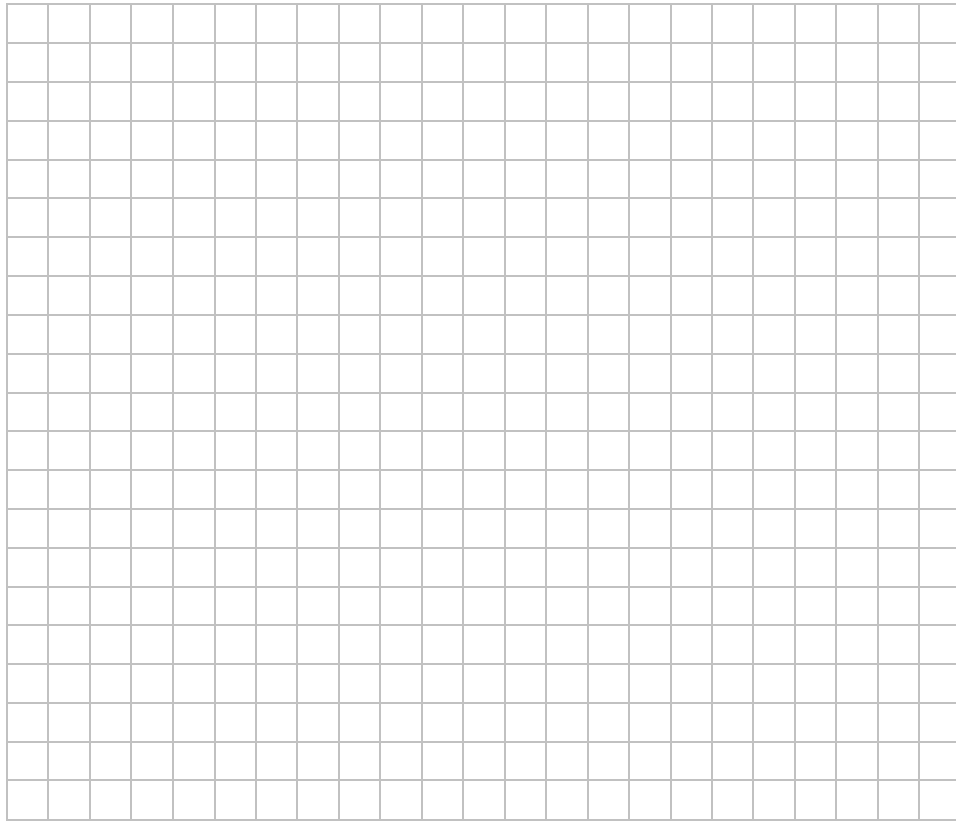
b) (4 points) Find the x-intercept(s) as points.

c) (2 points) Find the y-intercept(s) as points.

d) (10 points) Find any maximum and minimum points.

e) (6 points) Find any points of inflection.

f) (8 points) Sketch the function.



6. (6 points) Is the curve $y = 3x^4 + 2x^3 + 2x - 1$ increasing or decreasing at $x = -2$? Show your work to justify your answer.

7. (6 points) Is the curve $y = 2x^4 + 5x^3 + 4$ concave upward or concave downward at $x = -2$? Explain your answer.

8. Use the curve $y = \frac{4x-8}{x+1}$ to answer the following questions.

a) (2 points) Find the domain of y .

b) (2 points) Find the vertical asymptotes for the curve.

c) (4 points) Find the horizontal asymptotes for the curve. (No limits, no credit)

d) (4 points) Find x - and y -intercepts as points.

9. (8 points) Find the second derivative for $y = \sqrt{4x+1}$