

Exam #2

June 19, 2015

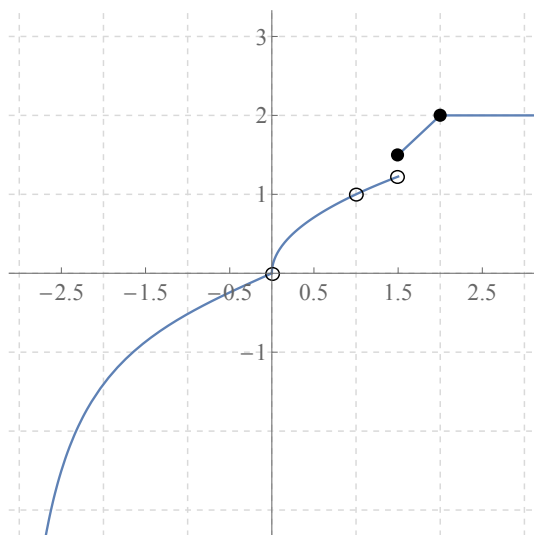
Name _____

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.
- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.
- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of "0" will be assigned to anyone who opens a cell phone during the examination or if one is found on their seat or hand.

No graphing calculators are allowed!

1. (10 points) Find the point (x, y) , at which the graph $y = 3x^2 + 3x - 10$ has a horizontal tangent.

2. (10 points) Graph the derivative of the function graphed below.



3. (5 points) The derivative of a function represents an instantaneous rate of change of the function with respect to its variable. (true/false)

4. (10 points) Find the first and second derivatives.

a) $y = 6x^3 + 5x - 6x^{-3}$

b) $y = e^{2x^2}$

5. (10 points) Find the first derivative of the function.

a) $y = (3 - t)(1 + t^2)^{-1}$

6. (10 points) At time t , the position of a body moving along the s -axis is $s = -t^3 + 9t^2 - 24t$ m.

- a) Find the body's acceleration each time the velocity is zero.
- b) Find the body's speed each time the acceleration is zero.

7. (10 points) Find the first and the second derivative of the function.

$$s = 7 \sec t$$

8. (10 points) Use implicit differentiation to find the derivative of y .

$$3x^2y + y^2 = x + y$$

9. (5 points each) Find the derivative of y .

a) $y = \frac{\ln x}{e^x + \ln x}$

b) $y = \sec^{-1}(3x^2 + 3)$

10. (5 points) Use logarithmic differentiation to find the derivative of y . Do not simplify your answer.

$$y = (x + 3)^3(x^2 - 9)^2(1 - x)$$

11. ~~(10 points) Use logarithmic differentiation to find the derivative of y .~~

$$y = (\sin x)^x$$

12. (10 extra points) When a circular plate of metal is heated in an oven, its radius increases at a rate of $0.03\text{cm}/\text{min}$. At what rate is the plate's area increasing when the radius is 73 cm ?