

Guidelines

- **Calculators are not allowed.**
 - Read the questions carefully. You have 50 minutes; use your time wisely.
 - You may leave your answers in symbolic form, like $\sqrt{3}$ or $\ln(2)$, unless they simplify further like $\sqrt{9} = 3$ or $\cos(3\pi/4) = -\sqrt{2}/2$.
 - Put a box around your final answers when relevant.
 - Show all steps in your solutions and make your reasoning clear. Answers with no explanation will not receive full credit, even when correct.
 - Use the space provided. If necessary, write - See other Side - and continue working on the back of the same page.
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1. (8 points) To be completed once exams are graded and returned. Please correct any problem with points deducted. All corrections should be completed neatly on a separate sheet of paper. Once you have finished your corrections, take your exam and corrections to the Office of Student Learning (OSL), and a tutor will check your answers and sign below. The checked solutions should be given to your instructor.

Signature: _____

Print Name: _____

Date: _____

Question	Points	Score
1	8	
2	26	
3	6	
4	6	
5	6	
6	8	
7	8	
8	12	
9	10	
10	10	
Total:	100	

2. Find $\frac{dy}{dx}$ for each of the following: (Do not simplify)

a. (2 points) $y = x^3 - 3(x^2 + \pi^2)$

a. _____

b. (2 points) $y = \ln 5$

b. _____

c. (2 points) $y = e^{2x+3}$

c. _____

d. (2 points) $y = \sqrt{x^2 + 3x}$

d. _____

e. (2 points) $y = \tan(\pi x)$

e. _____

f. (2 points) $y = \sin(7x)$

f. _____

g. (2 points) $y = 2^{x^2}$

g. _____

h. (2 points) $y = \frac{1}{7x^2 + 3x}$

h. _____

i. (2 points) $y = \log_2(4x)$

i. _____

j. (2 points) $y = \arcsin \sqrt{x}$

j. _____

k. (2 points) $y = \cos^3(1 - 3x)$

k. _____

l. (2 points) $y = \arctan(9x)$

l. _____

m. (2 points) $y = \ln(x^{5/2} - 3)$

m. _____

3. (6 points) Find dy/dx for $y = x^2 \sin^2(2x^2)$

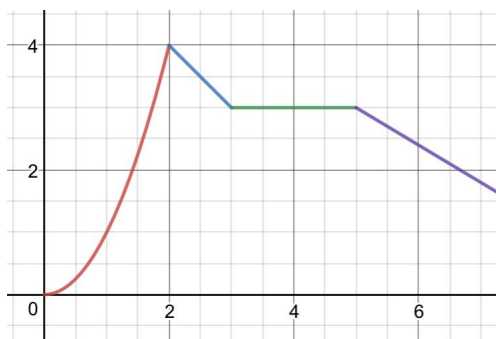
4. (6 points) Find dy/dx for $y = \frac{13x}{(2\sqrt{x} + 2)^2}$

5. (6 points) Find dy/dx for $y = 3x + \frac{9}{x}$ using the definition of derivative.

6. (8 points) Find dy/dx for $x^3 + 4xy - 3y^{4/3} = 2x$.

7. (8 points) Find dy/dx for $y = (1 + 3x^2)^{6x}$.

8. Given the position function, $s = f(t)$, where $0 \leq t \leq 10$, seen below, answer the following questions:



a. (3 points) $\lim_{h \rightarrow 0} \frac{f(6+h) - f(6)}{h}$

a. _____

b. (3 points) Where is $\frac{ds}{dt} = 0$?

b. _____

c. (3 points) Where is $f'(t) > 0$?

c. _____

d. (3 points) Where is $f'(t)$ undefined?

d. _____

9. (10 points) Find an equation of the line tangent to the curve $y = \tan x$ at $x = -\pi/4$.

10. (10 points) The length ℓ of a rectangle is decreasing at a rate of 2 cm/sec while the width w is increasing at a rate of 2 cm/sec. When $\ell = 12$ cm and $w = 5$ cm, find the rate of change of the length of the diagonals of the rectangle.