

MATH 217
FINAL EXAM
Prof. Jesenko Vukadinović

Name: _____
TA: _____

P1 (a)	
P1 (b)	
P2	
P3 (a)	
P3 (b)	
P3 (c)	
P4	
P5	
P6	
P7	
P8 (a)	
P8 (b)	
TOTAL	

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Read each question carefully and try to understand it before answering the questions. You may use the back of the pages if you need extra space. **Show all the computations to get full credit. Write clearly. Good luck!!**

1. Let R be the region in the first quadrant, bounded by the parabola $y = 9 - x^2$, the x -axis and the lines $x = 1$ and $x = 2$. Sketch the region and then determine
 - (a) The volume of the solid obtained when revolving R about the x -axis.
 - (b) The volume of the solid obtained when revolving R about the y -axis.

2. Find the derivative dy/dx of:

$$y = 2^{\cos x} \cdot x^{\ln^2 x}$$

3. On the surface of the moon, the acceleration of gravity is -5.28 feet per second per second. If an object is thrown upward from an initial height of $1,500$ feet with velocity of 100 feet per second,
- (a) find its velocity and height 10 seconds later.
 - (b) find the maximal height the object reaches.
 - (c) find the time the object falls on the surface of the moon.

4. Find the integral

$$\int \frac{x^4 - 4x^2 - 2x - 8}{x^2 - 4} dx$$

5. If a radioactive substance loses 15% of its radioactivity in 3 days, what is its half-life? What percentage of radioactivity is left after 10 days?

6. Find the integral

$$\int \frac{\ln x}{\sqrt{x}} dx$$

7. Find the integral

$$\int \frac{4dx}{x^2\sqrt{4-x^2}}$$

8. (a) Evaluate the limit.

$$\lim_{x \rightarrow 0} \frac{\cosh(3x) - 1}{x^2}$$

(b) Evaluate the improper integral, or show that it diverges:

$$\int_1^{\infty} \frac{2x}{(4+x^2)^2} dx$$