



Final Exam

Name: (print neatly) _____

Instructor: Joyce

Servatius

(sign) _____

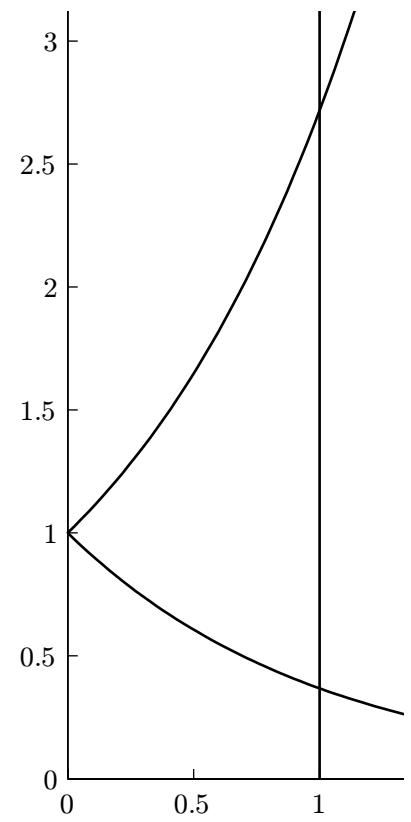
Prob	Pts
1	
2	
3	
4	
5	
6	
Total	

1. (9 pts) Suppose $f(1) = 0$, $f(3) = 5$, $f(5) = 3$, $f'(1) = 6$, $f'(3) = 7$, $f'(5) = 1$, $f''(1) = 2$, $f''(3) = 8$, and $f''(5) = 4$.

Compute $\int_1^5 (3f'(x) - 1) dx$.

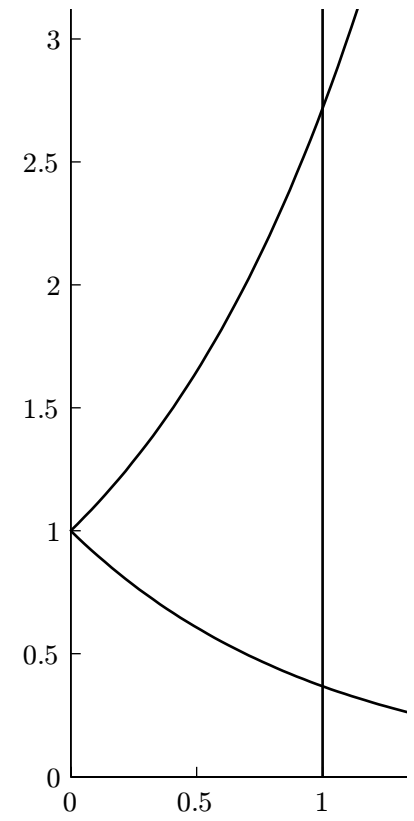
2. (9 pts) Suppose $\int_0^1 2f(x) dx = 6$ and $\int_1^3 (1 - f(x)) dx = 5$. What is the average value of $f(x)$ on the interval $[0, 3]$.

5. (9 pts) Find the area bounded by the curves $y = e^x$, $y = e^{-x}$, and $x = 1$.



4. (9 pts) Express as an integral with respect to x the volume of rotation of the region bounded by the curves $y = e^x$, $y = e^{-x}$, and $x = 1$ about the y -axis.

[DO NOT EVALUATE THE INTEGRAL]



9. (24 pts.) Evaluate the following derivatives.

a. $\frac{d}{dx} \ln \left(\frac{x^5 \sqrt{1-x}}{\sin^3(x) \cos(x)} \right) =$

b. $\frac{d}{dx} x^{x^2+1} =$

c. $\frac{d}{dx} (e^{3x} \arctan(2x)) =$

6. (40 pts.) Compute the following integrals:

a) $\int_{-1}^1 (5x^3 + 3x^2 + 7x) dx$

b) $\int \frac{\sin(3x)}{1 - \cos(3x)} dx$

c) $\int (x^x + 1) \sin(x) dx$

d) $\int \frac{3^{2x}}{2^x} dx$

$$e) \int (e + x)(1 + e^x) dx$$

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