
Math 109, Fall 2018
Midterm 1

Name:

Section:

Requirements:

- This exam should be completed in **45 minutes**.
 - Books, notes, calculators, computers, discussion and collaboration are not allowed.
 - Do all of your work in this exam booklet.
 - Simplify all answers as far as possible.
 - Solutions without proper justification will receive no credit.
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Problem	Points	Score
1	30	
2	15	
3	15	
4	20	
5	20	
Total	100	

Problem 1. (30') Compute the following integrals

(a). $\int \tan^5 x \sec^3 x dx.$

(b). $\int \sin^2 x \cos^2 x dx.$

Problem 2. (15') Find the general solution to the differential equation

$$y'(x) = (y - 1) \cos x. \quad (1)$$

Problem 3. (15') Solve the differential equation

$$y'(x) + y = \sin x, y(0) = 1. \quad (2)$$

Problem 4. (20') Compute the following integral

$$\int \frac{e^{3x}}{e^{2x} - 2e^x + 1} dx. \quad (3)$$

Problem 5 (20')

(a). (8') Draw the parametric curve $x = \cos t, y = \sin t$, for $t \in [0, 2\pi]$.

(b). (12') Find the point/points on this curve, at which the tangent line is parallel to the line $y = x + 1$.