

Math 232 Calculus 2 Spring 25 Sample midterm 1

- (1) Find $\int \frac{\cos x}{1 - \sin x} dx$.
- (2) Find $\int \frac{\cos x}{1 - \sin^2 x} dx$.
- (3) Find the area between the two curves $y = \tan(x)$ and $y = 2 \sin(x)$ on the interval $[1/2, 3/2]$.
- (4) Consider the ellipsoid $x^2 + y^2 + 9z^2 = 16$.
 - (a) Write down a formula for the area of the vertical cross sections perpendicular to one of the axes. Hint: choose an axis which makes this easier.
 - (b) Use your answer above to find the volume of the ellipsoid.
- (5) Find the average value of e^{-4x} on the interval $[0, 4]$.
- (6) Use discs to find the volume of the object formed by rotating the triangle with vertices $(1, 0)$, $(1, 3)$ and $(4, 0)$ about the x -axis.
- (7) Find the volume of the sphere of radius R by rotating the semicircle bounded by $x^2 + y^2 = R^2$ about the x -axis, using cylindrical shells.
- (8) Find $\int x^2 \ln(x - 2) dx$.
- (9) Find $\int e^{-3x} \cos(2x) dx$.
- (10) Find $\int x e^{-x} \sin(x) dx$
- (11) Find $\int_0^{\pi/2} \sin^2(x) \cos^5(x) dx$.
- (12) Find $\int \sin(4x) \cos(5x) dx$.

(13) Find $\int \frac{x^2}{\sqrt{x^2 + 4}} dx$.

(14) Find $\int \sqrt{9x^2 - 1} dx$.

(15) Find $\int \frac{x}{\sqrt{1 - 4x^2}} dx$.

(16) Find $\int \tan^3 2x dx$.

(17) Find $\int \frac{5x - 1}{x^2 - x - 2} dx$.

(18) Find $\int_0^1 \frac{3x^4 - 13x^3 + 8x^2 + 17x - 12}{x^2 - 5x + 6} dx$.

(19) Find $\int \frac{x^2 - 5x}{x^3 + x^2 - x - 1} dx$.

(20) Find $\int \frac{4x^2 + 7}{x^4 + 4x^2 + 4} dx$.