

Math 142 Sample Problems for Exam 2

Here are some sample integrals to compute. The actual exam will probably consist of about 5 or 6 integrals of different types and maybe one or two other problems. Know method of substitution, integration by parts, trig integrals, trig substitution, partial fractions and improper integrals. Also remember derivatives of exponential, logarithmic, and inverse trigonometric functions and L'Hôpital's rule.

Question 1

- | | |
|--|---|
| a) $\int \frac{e^{2x}}{1 - e^{2x}} dx$ | b) $\int_1^2 \frac{e^{1/x}}{x^2} dx$ |
| c) $\int \frac{4x}{\sqrt{x^4 + 1}} dx$ | d) $\int_1^2 xe^{2-x} dx$ |
| e) $\int \frac{x - 8}{\sqrt{x^2 + 4x}} dx$ | f) $\int \frac{1 - 7x^2}{x(x^2 - 1)} dx$ |
| g) $\int_1^e \frac{dx}{x[1 + (\ln x)^2]}$ | h) $\int \frac{2 \sin x \cos x}{(\sin x - 2)^2} dx$ |
| i) $\int \frac{x - 2}{\sqrt{x^2 - 4x + 2}} dx$ | j) $\int e^{3x} \cos 5x dx$ |
| k) $\int_1^4 \frac{3}{\sqrt{x^2 - 10x + 25}} dx$ | l) $\int \frac{x}{\sqrt{6 - 4x - 2x^2}} dx$ |
| m) $\int \sin^5 3x dx$ | n) $\int x^5 \ln x dx$ |
| o) $\int_0^\infty \frac{x}{(x + 2)(x + 3)} dx$ | p) $\int_0^4 \frac{1}{\sqrt{x^2 + x - 2}} dx$ |

Question 2 Find the volume of the solid of revolution obtained by revolving the graph of $y = \tan^2 x$ about the x -axis from $x = 0$ to $x = \pi/4$.