

NAME: _____ (from Math 21, Exams 4 & 5 June, 2004)
(Last, First)

3. (25 *points*) Find the most general anti-derivatives. (a) $3x^2 + 5$

(b) $\sqrt{x} + \frac{1}{x^2}$

(c) $3e^x + 2 \cos x$

3. (20 *points*) Find the general indefinite integral. (a) $\int 3x^2 + 5 \, dx$

(b) $\int \sec^2 x \, dx$

(c) $\int \frac{1}{x^2 + 1} \, dx$

4. (20 points) Use Part 2 of the Fundamental Theorem to evaluate the given integrals. (a) $\int_1^4 \frac{1}{x^3} dx$

(b) $\int_0^1 e^x dx$

(c) $\int_0^1 (\sqrt{x} + 5x^2 + 1) dx$

5. (25 points) Evaluate the integral by using a substitution.

(a) $\int \sin 2x dx$, with $u = 2x$

(b) $\int x\sqrt{x^2 + 3} dx$, with $u = x^2 + 3$

(c) $\int \sqrt{5t - 3} dx$.

5. (15 *points*) Find the following indefinite integrals. (a) $\int \cos 3x \, dx$

(b) $\int x^2 \sqrt{5 - x^3} \, dx$