

EXAM 1
Math 132
July 13, 2007

Name _____

1. Find the family of antiderivatives for $f(x) = x^2 - e^x$.

2. Solve the differential equation $\frac{ds}{dt} = -32t + 100$, if $s = 50$ when $t = 0$.

3. Find the derivative $\frac{d}{dx} \int_{0.5}^x \arctan(t^2) dt$.

4. Find each of the following integrals. No credit will be given for a correct answer which has no supporting arguments. (No, the statement "I used the calculator" is NOT a supporting argument.)

(a) $\int y^2 - \pi y + y^{-1} dy.$

(b) $\int z^2 \cos(3z) dz.$

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

(d) $\int_1^3 x \ln x \, dx$

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

(f) $\int \frac{(\ln(2t))^2}{t} \, dt.$

(g) $\int_0^{\frac{\pi}{4}} \sin(\theta) \cos^4(\theta) d\theta.$

(h) $\int_3^{\infty} \frac{z-1}{\sqrt{(z^2-2z)^3}} dz.$

(i) $\int \frac{1}{\tan(3x)} dx.$

5. We know that $\int_0^{\frac{\pi}{2}} \sin x \, dx = 1$. Estimate $\int_0^{\frac{\pi}{2}} \sin x \, dx$ using SIMP(17). What is your error? If you wish to increase your accuracy by four decimal points how many rectangles (n 's) would you need to use?

6. Does $\int_2^{\infty} \frac{dy}{\sqrt{y^4 + 8}}$ converge or diverge? Why?

7. A cat, walking along the window ledge of a New York apartment, knocks off a flower pot, which falls to the street 200 feet below. How fast is the pot traveling when it hits the street? (answer in ft/sec remembering that acceleration due to gravity is -32 ft/sec^2)