

MATH 1952 Practice Exam 1

Name: _____

Instructions: This test should have 7 problems, and is out of 100 points. Please answer each question as completely as possible, and show all work unless otherwise indicated. You may use an approved calculator for this exam. (Approved: non-graphing, non-programmable, doesn't take derivatives)

1. For the function $f(x) = x^2$, find approximations to the definite integral \int_{-1}^3 by using:

(a) 4 rectangles, left endpoints

(b) 4 rectangles, lower sum

2. A ball is thrown upwards off the top of the Empire State Building (height of 1250 feet) at a speed of 64 feet per second. For this problem, you can use the fact that acceleration due to gravity is -32 feet per second squared.

(a) Find a general formula for the velocity of the ball (in feet per second) after t seconds, and use your answer to find out when the ball is at its maximum height (hint: its velocity will be 0 then!)

(b) Find a general formula for the height of the ball (in feet) after t seconds.

3. Compute the following integrals, which should not require u -substitution.

(a) $\int \sqrt{x}(1 + x + x^2) dx$

(b) $\int_0^{\frac{\pi}{3}} \frac{\cos^3 x + \sin^2 x}{\cos^2 x} dx$

4. Compute the following integrals by using u -substitution.

(a) $\int (x^2 + 3)e^{x^3+9x+2} dx$

(b) $\int_0^{\frac{\pi}{2}} \frac{\cos x}{1+\sin^2 x} dx$

5. Find the DERIVATIVE of the function $g(x) = \int_7^{x^2} \frac{1}{1+t^{10}} dt$ by using part 1 of the Fundamental Theorem of Calculus.

6. Find the area trapped between the curves $f(x) = x^2 - 2$ and $g(x) = x$.

7. The following is a graph $y = f(x)$ for a function $f(x)$. (next page) Sketch a graph of $y = F(x)$ on the same axes, where $F(x)$ is an ANTIDERIVATIVE of

$f(x)$.

