

# 232 TEST 2

You may use your notebook during the last fifteen minutes of this exam.  
You may NOT use calculators, cell phones, loose papers, or peeking.

Math 232  
October 20, 2011

Name: \_\_\_\_\_  
By printing my name I pledge to uphold the honor code.

1. For each problem CIRCLE all that apply, and CROSS OUT all that do not apply. If you do nothing on an item I will assume that you meant to cross it out. Problems could possibly have one, many, or no answers to circle.

a) Which of the following are true statements?

3pts each on/off

(12pts)

$\sin^{-1} \frac{1}{2} = \frac{\pi}{6}$      ~~$\sec^{-1} x = \cos x$~~      ~~$\sec^{-1} x = \frac{1}{\cos^{-1} x}$~~      ~~$\tan^{-1} 0$  is undefined~~



b) Which of the following is a 20-rectangle Right Sum approximation for  $\int_2^6 f(x) dx$ ?

Circle none in 5x10!

(12pts)

~~$\sum_{k=1}^{20} f(2 + \frac{k}{100})(0.01)$~~      ~~$\sum_{k=1}^{40} f(2 + \frac{k}{10})(0.01)$~~      ~~$\sum_{k=1}^{40} f(2 + \frac{k}{100})(0.1)$~~      $\sum_{k=1}^{40} f(2 + \frac{k}{10})(0.1)$

$\Delta x = \frac{6-2}{40} = \frac{4}{40} = \frac{1}{10} = 0.1$   
 $x_n = a + k\Delta x = 2 + 0.1k = 2 + \frac{k}{10}$

c) Which of the following can we integrate using the techniques covered so far in class?

(15pts)

$\int \frac{1}{1+x} dx$      $\int \frac{1}{1+x^2} dx$      ~~$\int \frac{x}{1+x} dx$~~      $\int \frac{x}{1+x^2} dx$      ~~$\int \frac{x^2}{1+x} dx$~~

$\ln|1+x| + C$      $\tan^{-1} x + C$      $\frac{1}{2} \ln|1+x^2| + C$

d) Which of the following are equivalent to the Fundamental Theorem of Calculus?

(9pts)

~~$[\int G'(x) dx]_a^b = \int_a^b G(x) dx$~~      $\int_a^b f''(x) dx = [f'(x)]_a^b$      ~~$\int_a^b h(x) dx = [h'(x)]_a^b$~~

48

53

2. Write down the  $n$ -rectangle Right Sum approximation for  $\int_2^4 (x^2 + 1) dx$  and simplify until that the only letters that appear in the sum are  $k$  and  $n$ .  
Please do NOT try to calculate the sum; just write it down.

13 pts

$$\Delta x = \frac{4-2}{n} = \frac{2}{n}$$

$$x_k^* = 2 + k \cdot \frac{2}{n}$$

$$\sum_{k=1}^n \left( \left( 2 + \frac{2k}{n} \right)^2 + 1 \right) \left( \frac{2}{n} \right)$$

3 pts each

f

$x_k^*$

$\Delta x$

$\Sigma$

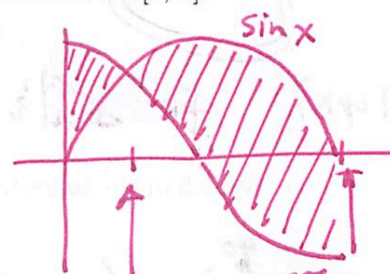
+1 for all or  
all but one

3. In each problem write the quantity described in terms of one or more definite integrals.  
Please do NOT try to solve the definite integrals; just write them down.

- a) The area between the graphs of  $\sin x$  and  $\cos x$  on the interval  $[0, \pi]$ .

13 pts

$$\int_0^{\pi/4} (\cos x - \sin x) dx + \int_{\pi/4}^{\pi} (\sin x - \cos x) dx$$

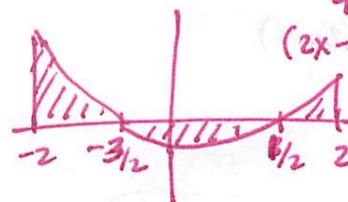


( $\sin x = \cos x$  at  $\pi/4$ )

- b) The unsigned area of the region between the graph of  $f(x) = 4x^2 + 4x - 3$  and the  $x$ -axis on the interval  $[-2, 2]$ .

13 pts

$$\int_{-2}^{-3/2} f(x) dx - \int_{-3/2}^{1/2} f(x) dx + \int_{1/2}^2 f(x) dx$$



$$4x^2 + 4x - 3 = 0$$

$$(2x - 3)(2x + 1) = 0$$

- c) The change in temperature, after 10 minutes, of a hot potato that is cooling at a rate of  $T'(t) = -15e^{-0.5t}$  degrees per minute.

13 pts

$$\int_0^{10} -15e^{-0.5t} dt$$