MATH 75

Test 3

May 10, 2004

Name:_____

- No books, notes, or calculators are allowed.
- Please show all your work.
- Please simplify your answers.

Multiple choice questions: circle the correct answer

1. Which of the following in an antiderivative of $f(x) = \sqrt{x} + \cos x$?

A. $\dfrac{1}{2\sqrt{x}} + \sin x$ **B.** $\dfrac{x^{-1/2}}{2} - \sin x$ **C.** $\dfrac{2x^{3/2}}{3} + \sin x$

D. $\dfrac{x^{3/2}}{3/2} - \sin x$ **E.** $\sqrt{\dfrac{x^2}{2}} + \cos\left(\dfrac{x^2}{2}\right)$

2. $\displaystyle\int_{-2}^{5} (x+1)\,dx =$

A. -17.5 **B.** 0 **C.** $\dfrac{27}{2}$ **D.** $\dfrac{35}{2}$ **E.** 18.5

3. $\displaystyle\int x\sin(x^2)\,dx =$

A. $\dfrac{x}{2}\cos(x^2) + C$ **B.** $\dfrac{x}{2}\cos\dfrac{x^3}{3} + C$ **C.** $-\dfrac{x}{2}\cos\dfrac{x^3}{3}$

D. $-\dfrac{\cos(x^2)}{2} + C$ **E.** $\sin(x^2) + 2x^2\cos(x^2)$

4. If $f(x) = \displaystyle\int_0^x \sin(3-t)\,dt$, then $f'(x) =$

A. $\sin(3-x)$ **B.** $cos(3-x)$ **C.** $-\cos(3-x)$ **D.** $x\sin(3-x)$ **E.** $-x\cos x$

5. Use Newton's Method to approximate the root of $x^5 = 5$. Let $x_1 = 1$. Find x_2.

A. 0.2 **B.** 1.8 **C.** 1.9 **D.** 2 **E.** 2.25

6. Find the average value of the function $f(x) = x^3 + x$ on the interval $[0, 2]$.

A. 0 **B.** 1.5 **C.** 2 **D.** 3 **E.** 6

Regular problems: show all your work

7. Evaluate the integral $\int_0^{\sqrt{3}} x\sqrt{x^2+1}dx$

8. If $f'(x) = x^2 + \sin(x) + 1$ and $f(0) = 4$, find $f(x)$.

9. Find the area of the region enclosed by $y = |x| - 1$ and $y = 3$

10. Find the volume of the solid obtained by rotating about the x-axis the region under the curve $y = 4 - x^2$ and above the x-axis.

11. Find the point on the line $y = 3x - 7$ closest to the point $(10, 0)$.

12. Find the volume of the solid obtained by rotating about the line $x = 0$ the region under the graph of $f(x) = \dfrac{1}{x^3}$ between $x = 0$ and $x = 1$.

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Problem	Value	Score
1	3	
2	3	
3	3	
4	3	
5	3	
6	3	
7	5	
8	5	
9	5	
10	5	
11	6	
12	6	
Total	50	

	Your scores so far	Out of
Homework		163
Quizzes		50
Mathematica		20
Test 1		50
Test 2		50
Test 3		50
Total		383
Grade		

This page may be used as scratch paper