Name _____ Calculus 2 Test 2B Spring 2007 Mike Huff

Show all work on the test paper for partial credit. No TI-89 solutions allowed.

(10 points)

1. Find the area of the region bounded by the curves $y = \frac{1}{x^2}$, $y = x$, and the line $x = 3$.

(10 points)

2. Find the area between the curves $x = 2y - 4$ and $y = \frac{x^2}{4}$.

(10 points)

3. Find the average value of the function $f(x) = \ln x$ on the interval $x \in [1, e]$.

(9 points)

4. Find the volume of the solid generated by revolving about the *x*-axis the region bounded by: the $y = \frac{1}{x}$, the *x*-axis, and the line $x = 1$.

(8 points)

5. Find the volume of the solid generated by revolving about the *x*-axis the region bounded by the curves $y = x^2 + 1$ and $y = 5 - x^2$.

(8 points)

6. Find the volume of the solid generated by revolving about the *y*-axis the region bounded by the curve $y = \sqrt{x}$, the *x*-axis, and the line $x = 4$. Please use cylindrical washers.

(8 points)

7. Find the volume of the solid generated by revolving about the y-axis the region bounded by the curve $y = \sqrt{x}$, the x-axis, and the line $x = 4$. Please use shells.

(8 points)

8. Find the length of the curve given by the parametric equations:

$$\begin{cases} x = t^3 - 3t^2 \\ y = t^3 + 3t^2 \end{cases} \text{ for } t \in \left[0, \sqrt{5}\right]$$

(8 points)

9. Find the length of the arc of the curve $y = \frac{4\sqrt{2}}{3}x^{3/2} - 1$ from $x = 0$ to $x = 1$.

(15 points)

10. Let X be a continuous random variable with probability density function

$$f(x)=\begin{cases}\frac{1}{5}e^{-x/5} & x\geq 0\\ 0 & otherwise\end{cases}$$

a) Show that this is indeed a probability density function, i.e. Show that $\int_{-\infty}^{\infty} f(x)dx=1$

b) Find $P(0\leq X\leq 5)$

c) Find the cumulative density function, which gives $F(X)=P(X\leq x)=\int_{-\infty}^{x} f(x)dx$.

d) Find the median x_m. This is the value of x for which $F(x_m) = P(X \le x_m) = \frac{1}{2}$

e) Find the mean μ of the probability density function: $\mu = \int_{-\infty}^{\infty} xf(x)dx$

(6 points) The Bill Problem

11. Graph the first part of the parametric curve $x = \cos t$, $y = e^t$ that lies in the first quadrant and find the length of the curve.

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Test 2
Calculus 2
Math 2414
Spring 2007
Mike Huff

Tools: Any Calculator
Deadline: April 10th, 2007