Calculus I Test 4 Show ALL Work for Credit By _____
Spring 86 each problem worth 10 points SS# _____

1. A. Simplify $\log_4 1/32$ B. Find b if $\log_b 81 = -4/3$.

(5,0,3,1,1,3,3,2,2,0,0)

50
24
7
6
15
12
6
4
124

$\frac{124}{200} \approx 62\%$

2

2. If $x = 4^{-2t} + \log_4 3t^2 + \arcsin 4t + \arctan e^{\ln \pi/2} + \cosh(2t+7)$, Find $\frac{dx}{dt}$

(2,1,2,0,7,1,1,2,3,0,1)

20
9
16
42
5
4
6
6
108

$\frac{108}{200} \approx 54\%$

4

3. Find $\int 4^t + (4+t^2)^{-1}\, dt$.

(3,0,2,0,1,6,1,1,0,5,1)

30
16
6
30
4
3
5
94

$\frac{94}{200} \approx 47\%$

7

4. Find $\lim_{x\to\infty} x^3 e^{-x}$.

(11,0,0,0,0,0,1,3,1,3,1)

110
4
9
2
3
128

$\frac{128}{200} \approx 64\%$

1

$\frac{914}{2000} \approx 45.7\%$

124
108
94
128
454

454
207
253
914

5. Find the equation of the tangent line to $y = x^x$ at $x = 2$.

(2,0,2,1,5,4,1,3,1,1,0)

20
16
7
30
20
4
9
2
1

109

$\frac{109}{200} \approx 54.5$

3

6. Find $\lim_{x\to\infty} (x + e^{2x})^{1/x}$

(0,0,1,1,1,3,1,3,2,1,7)

8
7
6
15
4
9
4
1

44

$\frac{44}{200} \approx 22\%$

10

7. Find $\int (4u + 7)/(3u - 2)\, du$.

(0,1,0,0,1,4,2,1,2,4,5)

9
6
20
8
3
4
4

54

$\frac{54}{200} \approx 27\%$

8

109
44
54

207

8. Using the formulas: $\cosh^2 x - \sinh^2 x = 1$ and $\sinh(\operatorname{arcsinh} x) = x$, SHOW how to find an expression for the derivative of arcsinh x which doesn't contain any hyperbolic functions

(1,0,0,0,0,1,1,3,9,2,3)

10
5
4
9
18
2
48

$\frac{48}{200} \times 24\%$

9

9. Graph $y = xe^{-x}$. Be sure to locate relative extrema, points of inflection and the limits as $x \to \pm\infty$.

(1,1,0,1,2,5,3,2,2,0,3)

10
9
7
12
25
12
6
4
105

$\frac{105}{200} \times 52.5\%$

5

10. The half life of C^{14} is on the order of 5000 years. If a person died 20,000 years ago and when he died 20% of the carbon in his bones was C^{14} then what percent of the carbon in his bones is C^{14} today? (Note C^{14} decays into a non-carbon atom, and the other isotopes of carbon are not radioactive.) Assume all of the bones managed to survive the years.

(1,0,0,8,1,3,2,1,0,2,2)

10
56
6
15
8
3
2
100

$\frac{100}{200} \times 50\%$

48
105
100
253

6