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Calculus III - Spring 2015 - Mr. Clontz - Diagnostic Exam Retake
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Name: _____ Class: _____

- Mark only the correct answer from the given choices for each problem. You may use scratch paper to work out problems, but your scratch work will not be graded.

- This diagnostic test is closed-note and closed-book.

1. (5 points) Find $\frac{dz}{dt}$ given $z = \sin(3t)$.
   - $\bigcirc$ $\cos(t) + 3$
   - $\bigcirc$ $3\tan(3t)$
   - $\bigcirc$ $3\cos(3t)$
   - $\bigcirc$ $\sec^2(3t) + 3\sin(3t)$
   - $\bigcirc$ None of these

2. (5 points) Simplify $\sqrt{\sec^2(t) + 1}$.
   - $\bigcirc$ $\sqrt{2}$
   - $\bigcirc$ $\tan(t)$
   - $\bigcirc$ $\cos(t) + 1$
   - $\bigcirc$ $\sin(t) - 1$
   - $\bigcirc$ None of these

3. (5 points) Compute the limit $\lim\limits_{a \to 0} \dfrac{\cos(a) - 1}{a}$.
   - $\bigcirc$ 0
   - $\bigcirc$ $\frac{0}{0}$
   - $\bigcirc$ π
   - $\bigcirc$ -2
   - $\bigcirc$ None of these

4. (5 points) Find the second-order derivative of $f(x) = -2x^4 - 7x^2 + 8$.
   - $\bigcirc$ $-8x^2 - 14x$
   - $\bigcirc$ $-24x^2 - 14$
   - $\bigcirc$ $-\frac{2}{5}x^5 + 8x$
   - $\bigcirc$ 2
   - $\bigcirc$ None of these

5. (5 points) Find the rate of change $\frac{dy}{dx}$ for $xy = 3x^2 - 2y$ at $(1,1)$.

    $\bigcirc$ $-\dfrac{3}{2}$

    $\bigcirc$ 3

    $\bigcirc$ $\dfrac{5}{3}$

    $\bigcirc$ $\dfrac{8}{5}$

    $\bigcirc$ None of these

6. (5 points) Evaluate $\displaystyle\int_{-1}^{1} 6x^2 \, dy$.

    $\bigcirc$ 12

    $\bigcirc$ 4

    $\bigcirc$ 3

    $\bigcirc$ $-\frac{8}{3}$

    $\bigcirc$ None of these

7. (5 points) Evaluate $\displaystyle\int_{0}^{2} 3e^{3y} \, dy$.

    $\bigcirc$ $3e^3 + 2$

    $\bigcirc$ $e^6 - 1$

    $\bigcirc$ $\ln(6)$

    $\bigcirc$ $\ln(e^2 - 1)$

    $\bigcirc$ None of these

8. (5 points) Evaluate $\int xe^x\, dx$.

○ $x^2 \ln(x) - e^x + C$

○ $x \ln(x) + \ln(x) + C$

○ $xe^x - e^x + C$

○ $e^x - 4e^x \ln(x) + C$

○ None of these

9. (5 points) Find $f'(x)$ where $f(x) = 4x \ln(x)$.

○ $4 \ln(x) + 4$

○ $\sin(4x + \ln(x))$

○ $2x + \ln(4x)$

○ $\dfrac{4x}{4 + \ln(x)}$

○ None of these

10. (5 points) Give the equation of the line from $(0, -2)$ to $(2, 4)$.

○ $y = -2x + 4$

○ $y = -x - 5$

○ $y = 6x + 4$

○ $y = 3x - 2$

○ None of these