Calculus III - Spring 2015 - Mr. Clontz - Diagnostic Exam

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 $z = e^{2t}$.

- ◯ $2 \ln t$
- ◯ $\frac{1}{2} \ln t$
- √ $2e^{2t}$
- ◯ $\frac{1}{2} e^{2t}$
- ◯ None of these

2. (5 points) Simplify $\sqrt{16 \sin^2 t + 9 \sin^2 t + 25 \cos^2 t}$.

- √ 5
- ◯ $5 \tan t$
- ◯ $\sqrt{50}$
- ◯ $\cos 5t$
- ◯ None of these

3. (5 points) Compute the limit $\lim_{x \to 4} \dfrac{\sqrt{x} - 2}{x - 4}$.

- √ $\dfrac{1}{4}$
- ◯ $\dfrac{0}{0}$
- ◯ -2
- ◯ 4
- ◯ None of these

4. (5 points) Find the second-order derivative of $f(x) = 3x^3 - 5x^4 + 1$.

- ◯ $9x - 20x^3$
- ◯ 4
- ◯ $x^2 - x^5 + 1$
- √ $18x - 60x^2$
- ◯ None of these

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

- √ $\frac{3}{2}$
- ◯ $\frac{5}{3}$
- ◯ -4
- ◯ $-\frac{10}{3}$
- ◯ None of these

6. (5 points) Evaluate $\int_1^2 4y^3\,dy$.

- ◯ 3
- √ 15
- ◯ -4
- ◯ 8
- ◯ None of these

7. (5 points) Evaluate $\int_0^{\pi/8} 4\cos 2\theta\,d\theta$.

- ◯ $\frac{\pi}{2}$
- √ $\sqrt{2}$
- ◯ $-\sqrt{3}$
- ◯ $\frac{1}{2}$
- ◯ None of these

8. (5 points) Evaluate $\int 2x \ln x \, dx$.

◯ $x^2 e^x + C$

◯ $\frac{2}{x} + C$

√ $x^2 \ln x - \frac{x^2}{2} + C$

◯ $x^2 + x \ln x + C$

◯ None of these

9. (5 points) Find $f'(x)$ where $f(x) = e^x \tan x$.

◯ $e^x \sec x$

◯ $\ln(\tan x)$

◯ $\ln x \tan x - e^x \cos x$

√ $e^x \sec^2 x + e^x \tan x$

◯ None of these

10. (5 points) Give the equation of the line from $(1, 3)$ to $(3, -7)$.

◯ $y = -x + 4$

◯ $y = 2x - 1$

◯ $y = 4x - 1$

√ $y = -5x + 8$

◯ None of these