

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 $\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$.
- ☐ $\frac{1}{4}$
 - ☐ $\frac{0}{0}$
 - ☐ -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