

Test Form A

Name _____ Date _____

Chapter 5

Class _____ Section _____

1. Find the derivative: $f(x) = \ln \frac{\sqrt{x^2 + 1}}{x(2x^3 - 1)^2}$.

(a) $\frac{x}{x^2 + 1} - \frac{1}{x} + \frac{12x^2}{2x^3 - 1}$

(b) $\frac{x}{x^2 + 1} - \frac{1}{x} + \frac{6x^2}{2x^3 - 1}$

(c) $\frac{1}{(x^2 + 1)^{1/2}(4x^2)(2x^3 - 1)}$

(d) $\frac{x}{x^2 + 1} - \frac{1}{x} - \frac{12x^2}{2x^3 - 1}$

(e) None of these

2. Differentiate: $y = x^{1-x}$.

(a) $y' = (1 - x)x^{-x}$

(b) $y' = x^{1-x} \left[\frac{1-x}{x} - \ln x \right]$

(c) $y' = (x - 1)x^{-x}$

(d) $y' = x^{1-x} \left(-\frac{1}{x} \right)$

(e) None of these

3. Find $\frac{dy}{dx}$ if $xe^y + 1 = xy$.

(a) 0

(b) $\frac{y - e^y}{xe^y - x}$

(c) $\frac{y}{e^y - x}$

(d) $\frac{e^y}{xe^y - 1}$

(e) None of these

4. Find y' if $y = \frac{x^3}{3^x}$.

(a) $\frac{x}{3^{x-2}}$

(b) $\frac{3x^2}{3^x(\ln 3)}$

(c) $\frac{x^2(9 - x^2)}{3^{x+1}}$

(d) $\frac{x^2[3 - x(\ln 3)]}{3^x}$

(e) None of these

5. Find $f'(x)$ for $f(x) = \cosh^2 x^2$.

(a) $-4x \cosh x^2 \sinh x^2$

(b) $4x \cosh x^2 \sinh x^2$

(c) $2x \sinh^2 x^2$

(d) $2 \cosh x^2 \sinh x^2$

(e) None of these

6. Find $\frac{dy}{dx}$ for $y = \arctan \frac{x}{2}$.

(a) $\frac{4}{4 + x^2}$

(b) $\frac{4}{1 + x^2}$

(c) $\frac{1}{\sqrt{4 - x^2}}$

(d) $\frac{1}{2} \sec^2 \left(\frac{x}{2} \right)$

(e) $\frac{2}{4 + x^2}$

7. Evaluate $\int_1^{5e} \frac{1}{x} dx$.

- (a) $\frac{1}{5e} - 1$ (b) 0 (c) ∞
 (d) $1 + \ln 5$ (e) None of these

8. Evaluate $\int \frac{x+2}{x+1} dx$.

- (a) $\frac{x^2+4x}{x^2+2x} + C$ (b) $2x + C$ (c) $x + C$
 (d) $x + \ln|x+1| + C$ (e) None of these

9. Evaluate $\int \tan 3x dx$.

- (a) $\frac{1}{3} \ln|\sec 3x| + C$ (b) $3 \sec^2 3x + C$ (c) $\frac{1}{3} \sec^2 3x$
 (d) $\ln|\cos 3x| + C$ (e) None of these

10. Evaluate $\int \frac{e^{1/(x+1)}}{(x+1)^2} dx$.

- (a) $\frac{e^{1/(x+1)}}{2(x+1)} + C$ (b) $\frac{e^{-x/(x+1)}}{(x+1)^2} + C$ (c) $-e^{1/(x+1)} + C$
 (d) $\frac{e^{-x/(x+1)}}{(x+1)^2}$ (e) None of these

11. Evaluate $\int \frac{x+3}{x^2+9} dx$.

- (a) $\ln|x-3| + C$ (b) $\frac{1}{3} \arctan \frac{x}{3} + C$
 (c) $\frac{1}{2} \ln(x^2+9) + \arctan \frac{x}{3} + C$ (d) $\ln(x^2+9) + \frac{1}{3} \arctan \frac{x}{3} + C$
 (e) None of these

12. Evaluate $\int \frac{\sin^2 x - \cos^2 x}{\sin x} dx$.

- (a) $-2 \cos x + \ln|\csc x + \cot x| + C$ (b) $-\ln|\csc x + \cot x| + C$
 (c) $-\sec x + C$ (d) $\cos x + \ln|\csc x + \cot x| + C$
 (e) None of these

13. Evaluate $\int \frac{dx}{\sqrt{8+2x-x^2}}$

(a) $\ln\sqrt{8+2x-x^2}$

(b) $\arcsin \frac{x-1}{3} + C$

(c) $\sqrt{8+2x-x^2} + C$

(d) $\frac{1}{3} \operatorname{arcsec} \frac{x-1}{3} + C$

(e) None of these

14. Determine whether $f(x) = \frac{x-b}{a}$ is one-to-one; if it is, find f^{-1} .(a) f is not one-to-one.

(b) $f^{-1}(x) = ax + b$

(c) $f^{-1}(x) = \frac{a}{x-b}$

(d) $f^{-1}(x) = \frac{x-a}{b}$

(e) None of these

15. Find an equation for the tangent line at the point where $x = 2$ on the graph of the function $f(x) = 5^{x/2}$.

(a) $y = \frac{5}{2}x + 3$

(b) $y = \frac{5}{2}x + 5$

(c) $y = \frac{5}{2}[(\ln 5)x - 2 \ln 5]$

(d) $y = \frac{5}{2}[(\ln 5)x - 2 \ln 5 + 2]$

(e) None of these