

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

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

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

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

Test Form B Chapter 5

Name _____ Date _____
Class _____ Section _____

1. Find the derivative: $f(x) = \ln \frac{x^2 \sqrt{4x+1}}{(x^3+5)^3}$.

(a) $\frac{x}{9x^2(x^3+5)^2 \sqrt{4x+1}}$

(b) $\frac{2}{x} + \frac{2}{4x+1} - \frac{9x^2}{x^3+5}$

(c) $\frac{2}{x} + \frac{1}{2(4x+1)} - \frac{3}{x^3+5}$

(d) $\frac{2}{x} - \frac{2}{4x+1} - \frac{9x^2}{x^3+5}$

(e) None of these

4. Find y' if $y = 3^x x^3$.

(a) $3^x x^3 [3 + (\ln 3)x]$

(b) $2x^2 3^{x-1}$

(c) $3^{x-1} x^2 [9 + x^2]$

(d) $9x^2$

(e) None of these

6. Find $\frac{dy}{dx}$ for $y = \arcsin \frac{x}{3}$.

(a) $\frac{1}{\sqrt{9-x^2}}$

(b) $\frac{3}{\sqrt{9-x^2}}$

(c) $\frac{x}{\sqrt{9-x^2}}$

(d) $\frac{3}{\sqrt{x^2-9}}$

(e) $\frac{3}{\sqrt{9+x^2}}$

7. Evaluate $\int_e^{4e} \frac{1}{x} dx$.

(a) $\ln 3e$

(b) $\ln 4$

(c) $-\frac{3}{4e}$

(d) $\frac{15}{16e^2}$

(e) None of these

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

(a) $2x - \ln|x+1| + C$

(b) $2x + C$

(c) $x^2 + \ln|x+1| + C$

(d) $\frac{2x^2+2x}{x^2+2x} + C$

(e) None of these

10. Evaluate $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$.

(a) $2e^{\sqrt{x}} + C$

(b) $\frac{1}{2}e^{\sqrt{x}} + C$

(c) $\sqrt{x}e^{\sqrt{x}} + C$

(d) $\sqrt{x}e^{\sqrt{x}+1} + C$

(e) None of these

11. Evaluate $\int \frac{x+2}{\sqrt{4-x^2}} dx$.

(a) $-\frac{1}{2}\sqrt{4-x^2} + 2\arcsin \frac{x}{2} + C$

(b) $-\sqrt{4-x^2} + 2\arcsin \frac{x}{2} + C$

(c) $\ln|2-x| + C$

(d) $x^2 + 2x + \arcsin \frac{x}{2} + C$

(e) None of these

13. Evaluate $\int \frac{5}{x^2+6x+13} dx$.

(a) $5\ln|x^2+6x+13| + C$

(b) $5\left(\frac{x^2}{3} + 3x^2 + 13x\right) + C$

(c) $\frac{5}{2}\arctan \frac{x+3}{2} + C$

(d) $-\frac{5}{x} + \frac{5}{6}\ln|x| + \frac{5}{13}x + C$

(e) None of these

Test Form A

1. d
2. ~~_____~~
3. ~~_____~~
4. d
5. ~~_____~~
6. e
7. d
8. d
9. a
10. c
11. c
12. ~~_____~~
13. b
14. ~~_____~~

Test Form B

1. b
2. ~~_____~~
3. ~~_____~~
4. a
5. ~~_____~~
6. a
7. b
8. a
9. ~~_____~~
10. a
11. b
12. ~~_____~~
13. c
14. ~~_____~~

Test Form C
Chapter 5

Name _____ Date _____
Class _____ Section _____

2. Differentiate: $f(x) = \ln(e^{-x^2})$.

- (a) e^{x^2} (b) $-2xe^{2x^2}$ (c) $-2x$
(d) $-2xe^{-x^2}$ (e) None of these

3. Find y' : $y = \arctan \sqrt{t}$.

- (a) $\frac{\sec^2 \sqrt{t}}{2\sqrt{t}}$ (b) $\frac{1}{2\sqrt{t}(1+t)}$ (c) $\frac{1}{2\sqrt{t}(1-t)}$
(d) $\frac{1}{1+t}$ (e) None of these

4. Find $f'(x)$ for $f(x) = 2/(2x + e^{2x})$.

- (a) 0 (b) $\frac{1}{1+e^{2x}}$ (c) $\frac{-4(1+e^{2x})}{(2x+e^{2x})^2}$
(d) $\frac{1+xe^{2x-1}}{(2x+e^{2x})^2}$ (e) None of these

6. Evaluate the integral: $\int \frac{t^2 + 1}{t + 1} dt$.

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

7. Evaluate the integral: $\int e^{(ax+b)} dx$.

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

8. Evaluate the integral: $\int x^{3x^2} dx$.

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

10. Evaluate the definite integral: $\int_1^4 \frac{1}{x^2 - 2x + 10} dx$.

- (a) 1.249 (b) $\frac{\pi}{12}$ (c) $-\frac{\pi}{4}$
(d) -0.0419 (e) None of these

Test Form D
Chapter 5

1. Find $\frac{dy}{dx}$ if $y = \ln \frac{\sqrt{x}}{5-x}$.

3. Find y' : $y = e^{1/x}$.

5. Find y' if $y = x^2 e^x$.

7. Evaluate $\int_2^{e+1} \frac{1}{x-1} dx$.

9. Evaluate $\int 19e^{-t/5} dt$.

10. Evaluate $\int \frac{e^x}{\sqrt{e^x + 1}} dx$.

11. Evaluate $\int \frac{5x + 16}{x^2 + 9} dx$.

12. Evaluate $\int \frac{1}{\sqrt{-3 + 4x - x^2}} dx$.

Test Form E
Chapter 5

4. A population of bacteria is changing at the rate of

$$\frac{dP}{dt} = \frac{2000}{1 + 0.2t^2}$$

where t is the time in days. The initial population is 1000.

- Write an equation that gives the population at any time t .
- Find the population after 10 days.

5. Differentiate: $f(x) = \frac{1}{(4 + e^{2x})^4}$.

6. Evaluate the integral: $\int \frac{e^{3/x}}{x^2} dx$.

9. Find the derivative: $h(x) = \arccos x^2$.

10. Evaluate the definite integral: $\int_{-1/\sqrt{3}}^{1/\sqrt{3}} \frac{3}{\sqrt{4 - 9x^2}} dx$.

11. Evaluate the integral: $\int \frac{x^2}{1 + x^4} dx$.

Test Form C

1. ~~_____~~ 2. c 3. b 4. c
 5. ~~_____~~ 6. d 7. b 8. c
 9. ~~_____~~ 10. b ~~_____~~

Test Form D

1. $\frac{1}{2x} + \frac{1}{5-x}$ ~~_____~~ 3. $-\frac{e^{1/x}}{x^2}$

~~_____~~ 5. $e^x x^{-1}(x+1)$ ~~_____~~

7. 1 ~~_____~~

9. $-95e^{-1/5} + C$ 10. $2\sqrt{e^x + 1} + C$

11. $\frac{5}{2} \ln(x^2 + 9) + \frac{16}{3} \arctan \frac{x}{3} + C$

12. $\arcsin(x-2) + C$ ~~_____~~

~~_____~~

Test Form E



4. a. $P = 10,000 \ln(1 + 0.2t) + 1000$

b. $10,000 \ln 3 + 1000 \approx 11,986$

5. $\frac{-8e^{2x}}{(4 + e^{2x})^5}$ 6. $-\frac{1}{3}e^{3/x} + C$



~~_____~~ 9. $\frac{-2t}{\sqrt{1-t^2}}$ 10. $\frac{2\pi}{3}$

11. $x - \arctan x + C$

Text Review

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~~79~~, 81