

6. Let $y = e^{2x}(x^2 + x + 1)$. Then $\frac{dy}{dx} =$

a. $2e^{2x}(x^2 + x + 1)$

b. $e^{2x}(x^2 + x + 1)$

c. $e^{2x}(2x + 1)$

d. $e^{2x}(2x + 1) + e^{2x}(x^2 + x + 1)$

e. $e^{2x}(2x^2 + 4x + 3)$

7. The curve $y = x^3 - 3x^2 - 9x + 4$ has a relative minimum at $x =$

a. 1

b. -1

c. 3

d. -3

e. 0

8. Let $y = \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)^2$. Then $\frac{dy}{dx} =$

a. $2\left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)$

b. $1 - \frac{1}{x^2}$

c. $2\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)$

d. $x^2 - 1$

e. $\sqrt{x} + \frac{1}{\sqrt{x}}$

9. Let $f(x) = \frac{2x+1}{x+1}$. Then $f'(x) =$

a. $\frac{1}{(x+1)^2}$

b. 0

c. $\frac{x}{(x+1)^2}$

d. $\frac{4x+3}{(x+1)^2}$

e. $\frac{x^2 - 2x - 1}{(x+1)^2}$

10. Let $f(x) = \ln [(x + 1) (x^2 + 1) (x^3 + 1)]$. Then $f'(x) =$

a. $\ln (x + 1) + \ln (x^2 + 1) + \ln (x^3 + 1)$

b. $\frac{1}{x + 1} + \frac{1}{x^2 + 1} + \frac{1}{x^3 + 1}$

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

d. $\frac{1}{x + 1} + \frac{x}{x^2 + 1} +$

e. $\frac{1}{x + 1} + \frac{2x}{x^2 + 1} + \frac{3x^2}{x^3 + 1}$

11. $e^{(2 \ln 3 - \frac{1}{2} \ln 9)}$ =

a. 6

b. 3

c. e^6

d. $\frac{1}{3}$

e. -6

12. Solve the equation $e^{2x} e^{3x} = 5$ for x:

a. $x=1$

b. $x = \frac{1}{5} \ln 5$

c. $x = -1$

d. $x=0$

e. $x = \frac{1}{5} e^5$

13. The slope of the curve $y = x \ln x$ at $x = 1$ is:

a. $\frac{1}{3}$

b. 2

c. 0

d. 1

e. $\ln 2$

14. $3 \ln 3 - \ln 9 - \ln 3 =$

a. 1

b. $-\ln 3$

c. $\ln 15$

d. $\ln 3$

e. 0

15. What is the compound amount of \$1,000 invested at 10% interest, compounded annually, at the end of two years?

- a. 1,210 b. $1,000 e^{0.2}$ c. 1,220
- d. 1,111.11 e. 1,200

16. $\int \left(x^2 + \frac{2}{x} \right) dx =$

- a. $\frac{1}{3} x^3 + 2 \ln |x| + C$ b. $\frac{1}{3} x^3$ c. $2x - \frac{2}{x^2} + C$
- d. $x^3 + 2 + C$ e. $2(x + \ln |x|) + C$

17. $\int 4e^{4x} dx =$

- a. $e^{4x} + C$ b. $16 e^{4x} + C$ c. $4 e^x + C$
- d. $e^{16x} + C$ e. $4x + e^{4x} + C$

18. The area under the graph of $f(x) = x^2 + 2$ from $x = 0$ to $x = 3$ is

- a. 33 b. 6 c. 15 d. 9 e. 12

19. $\int_0^9 \sqrt{x} \, dx =$

- a. 3 b. 27 c. $\sqrt{27}$ d. 18 e. $50/3$

20. Let $f(x)$ be a function satisfying $f'(x) = 3x^2 + 4$ and $f(1) = 1$. Then $f(0) =$

- a. 4 b. 5 c. -4 d. -5 e. 0

21. What is the present value of \$10,000, to be obtained in three years, if money can be invested at 10% interest, compounded continuously?

22. What is the effective annual interest rate of an investment of \$100 paying 10% interest compounded semi-annually?

