

Broward College

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find $f'(x)$.

1) $f(x) = 3e^x - 8x + 2$ 1) _____
 A) $3e^x - 6$ B) $3e^x - 8x$ C) $3xe^{x-1} - 8$ D) $3e^x - 8$

2) $f(x) = -2e^x + 9x - 4$ 2) _____
 A) $-2e^x + 9$ B) $-2e^x + 9x$ C) $-2xe^{x-1} + 9$ D) $-2e^x + 5$

3) $f(x) = x^8 + 3e^x$ 3) _____
 A) $8x^7 + 3e^x$ B) $8x^7 + e^x$ C) $8x + 3e^x$ D) $8x^7 + 3xe^{x-1}$

4) $f(x) = 9e^x - 2x^4$ 4) _____
 A) $9e^x - 8x^3$ B) $9e^x - 8x^4$ C) $9e^x - 4x^3$ D) $9xe^{x-1} - 8x^4$

5) $f(x) = -7 \ln x - x^5 + 2$ 5) _____
 A) $-\frac{7}{x} - 5x^4$ B) $\frac{7}{x} - 5x^4$ C) $-\frac{1}{7x} - 5x^4$ D) $-\frac{7}{x} - 5x$

Use appropriate properties of logarithms to rewrite $f(x)$, and then find $f'(x)$.

6) $f(x) = 5x + 4 \ln 2x$ 6) _____
 A) $5 + \frac{2}{x}$ B) $5 + \frac{4}{x}$ C) $7 + \frac{4}{x}$ D) $5 + \frac{8}{x}$

Find $\frac{dy}{dx}$ for the indicated function y .

7) $y = 7 \log x$ 7) _____
 A) $\frac{1}{x^7 \ln 10}$ B) $\frac{1}{x \ln 10}$ C) $\frac{7}{x \ln 10}$ D) $\frac{7}{10 \ln x}$

8) $y = 8^x$ 8) _____
 A) $8 \ln 8$ B) $8^x \ln x$ C) $8^x \ln 8$ D) $\frac{8^x}{\ln 8}$

9) $y = 3x^2 - \log_3 x$ 9) _____
 A) $6x + \frac{1}{3 \ln x}$ B) $3x - \frac{1}{x \ln 3}$ C) $6x - \frac{1}{x \ln 3}$ D) $6x - \frac{1}{3 \ln x}$

Find the equation of the line tangent to the graph of f at the indicated value of x .

10) $f(x) = 2e^x$; $x = 0$ 10) _____
 A) $y = x + 2$ B) $y = 2x$ C) $y = 2x + 2$ D) $y = 2x - 2$

- 11) $f(x) = 6e^x - 1$; $x = 0$ 11) _____
 A) $y = 6x + 6$ B) $y = 5x + 5$ C) $y = 6x + 5$ D) $y = 6x - 5$
- 12) $f(x) = 1 + 3e^x$; $x = 1$ 12) _____
 A) $y = 3e^x - 6e + 1$ B) $y = 3e^x + 1$ C) $y = 6e^x - 1$ D) $y = 3e^x + 6e + 1$
- 13) $f(x) = 8 + \ln x$; $x = 1$ 13) _____
 A) $y = x - 9$ B) $y = x - 7$ C) $y = x + 7$ D) $y = x + 9$

Solve.

- 14) The salvage value S (in dollars) of a company airplane after t years is estimated to be given by 14) _____
 $S(t) = 250,000(0.7)^t$. What is the rate of depreciation (in dollars per year) after 5 years?
 A) $-\$21,409/\text{yr}$ B) $-\$67,625/\text{yr}$ C) $-\$42,018/\text{yr}$ D) $-\$14,987/\text{yr}$
- 15) The resale value R (in dollars) of a company car after t years is estimated to be given by 15) _____
 $R(t) = 22,500(0.84)^t$. What is the rate of depreciation (in dollars per year) after 5 years?
 A) $-\$1378/\text{yr}$ B) $-\$1157/\text{yr}$ C) $-\$1641/\text{yr}$ D) $-\$15,144/\text{yr}$
- 16) The salvage value S (in dollars) of a company airplane after t years is estimated to be given by 16) _____
 $S(t) = 250,000(0.7)^t$. What is the rate of depreciation (in dollars per year) after 3 years?
 A) $-\$85,750/\text{yr}$ B) $-\$43,693/\text{yr}$ C) $-\$94,206/\text{yr}$ D) $-\$30,585/\text{yr}$
- 17) The resale value R (in dollars) of a company car after t years is estimated to be given by 17) _____
 $R(t) = 22,500(0.84)^t$. What is the rate of depreciation (in dollars per year) after 3 years?
 A) $-\$1641/\text{yr}$ B) $-\$1953/\text{yr}$ C) $-\$2325/\text{yr}$ D) $-\$14,651/\text{yr}$

Differentiate.

- 18) Find $f'(t)$ for $f(x) = (3x - 4)(4x^3 - x^2 + 1)$ 18) _____
 A) $f'(x) = 48x^3 - 19x^2 + 57x + 3$ B) $f'(x) = 12x^3 + 19x^2 - 57x + 3$
 C) $f'(x) = 48x^3 - 57x^2 + 8x + 3$ D) $f'(x) = 36x^3 + 57x^2 - 19x + 3$
- 19) Let f and g be functions that satisfy: $f(4) = -1$, $g(4) = 3$, $f'(4) = 2$, and $g'(4) = -3$. Find $h'(4)$ for 19) _____
 $h(x) = f(x)g(x) - 2f(x) + 7$.
 A) -5 B) -6 C) 6 D) 5
- 20) Find $f'(t)$ if $f(t) = 0.4t(5t^2 + 1)$ and simplify. 20) _____
 A) $f'(t) = 6t^2 - 0.4$ B) $f'(t) = 6t^2 + 4$ C) $f'(t) = 6t^2 + 40$ D) $f'(t) = 6t^2 + 0.4$
- 21) Find $f'(t)$ for $f(x) = \frac{x}{4x - 6}$ 21) _____
 A) $-\frac{6}{(4x - 6)^2}$ B) $-\frac{6x}{(4x - 6)^2}$ C) $-\frac{6}{4x - 6}$ D) $\frac{8x - 6}{(4x - 6)^2}$

22) Find $f'(t)$ for $f(x) = \frac{2x - 7}{3x - 2}$. 22) _____

A) $\frac{17}{(3x - 2)^2}$ B) $\frac{17}{(2x - 7)^2}$ C) $-\frac{17}{(3x - 2)^2}$ D) $-\frac{17}{(2x - 7)^2}$

23) Find $\frac{dy}{dx}$ for $y = \frac{2x - 5}{7x^2 + 9}$ 23) _____

A) $\frac{dy}{dx} = \frac{42x^2 - 70x + 18}{(7x^2 + 9)^2}$ B) $\frac{dy}{dx} = \frac{-14x^2 + 52x + 63}{(7x^2 + 9)^2}$

C) $\frac{dy}{dx} = \frac{14x^3 - 28x^2 + 88x}{(7x^2 + 9)^2}$ D) $\frac{dy}{dx} = \frac{-14x^2 + 70x + 18}{(7x^2 + 9)^2}$

Provide an appropriate response.

24) Find the derivative of the function $f(x) = \frac{2x - 7}{3x - 2}$ at $x = 2$. 24) _____

A) $-\frac{17}{4}$ B) $\frac{17}{4}$ C) $\frac{17}{16}$ D) $-\frac{17}{16}$

25) Find the values of x where the tangent line is horizontal for the graph of $f(x) = \frac{4x^2}{x + 2}$. 25) _____

A) $x = 0, x = -2$ B) $x = -2, x = 0, x = -4$
 C) $x = 0, x = -4$ D) $x = -2$

Solve the problem.

26) One hour after x milligrams of a particular drug are given to a person, the change in body temperature $T(x)$, in degrees Celsius, is given approximately by: 26) _____

$$T(x) = \frac{5x^2}{9} \left(1 - \frac{x}{9} \right) - \frac{160}{9}, \quad 0 \leq x \leq 6$$

Find the sensitivity, $T'(x)$, of the body to a dosage of three milligrams.

A) $-\frac{10}{9}$ degrees per mg B) $\frac{5}{3}$ degrees per mg
 C) $\frac{10}{3}$ degrees per mg D) $-\frac{5}{3}$ degrees per mg

Find the derivative.

27) Find $\frac{d}{d\omega} \frac{4}{(\omega^2 + 3)^5}$ 27) _____

A) $\frac{-40}{(\omega^2 + 3)^6}$ B) $\frac{40\omega}{(\omega^2 + 3)^6}$ C) $\frac{-40\omega}{(\omega^2 + 3)^6}$ D) $\frac{-40\omega}{(\omega^2 + 3)^5}$

28) Find $f'(x)$ for $f(x) = (8x - 9)^{-4}$. 28) _____

A) $-\frac{32}{(8x - 9)^5}$ B) $-\frac{4}{(8x - 9)^3}$ C) $-\frac{4}{(8x - 9)^5}$ D) $-\frac{32}{(8x - 9)^3}$

29) Find: $\frac{d}{dx} \left(\sqrt[8]{8x^7 - 10} \right)$ 29) _____

A) $\frac{7x^6}{(8x^7 - 10)^{7/8}}$

B) $\frac{56x^6}{(8x^7 - 10)^{7/8}}$

C) $448x^6 \sqrt[7]{8x^7 - 10}$

D) $8 \sqrt[7]{8x^7 - 10}$

Provide an appropriate response.

30) Find $f'(x)$ for $f(x) = (x^2 + 2)^3$. 30) _____

A) $f'(x) = 3x^5 + 24x^3 + 24x$

B) $f'(x) = 6x^5 + 12x^3 + 12x$

C) $f'(x) = 6x^5 + 24x^3 + 24x$

D) $f'(x) = 6x^5 + 20x^3 + 24x$

31) Find $f'(x)$ for $f(x) = (x^2 + 2)^3$. 31) _____

A) $f'(x) = 6x^5 + 20x^3 + 24x$

B) $f'(x) = 3x^5 + 24x^3 + 24x$

C) $f'(x) = 6x^5 + 12x^3 + 12x$

D) $f'(x) = 6x^5 + 24x^3 + 24x$

32) Find $\frac{dy}{dt}$ for $y = (5t^2 - 4t)^2$. 32) _____

A) $2(10t - 4)$

B) $(5t^2 - 4t)(10t - 4)$

C) $2(5t^2 - 4t)(10t - 4)$

D) $2(5t^2 - 4t) + (10t - 4)$

Find the equation of the tangent line to the graph of the given function at the given value of x .

33) $f(x) = (x^2 + 4)^{2/3}$; $x = 2$ 33) _____

A) $y = \frac{2}{3}x + \frac{4}{3}$

B) $y = \frac{4}{3}x + \frac{4}{3}$

C) $y = \frac{4}{3}x + \frac{20}{3}$

D) $y = \frac{4}{3}x$

Solve the problem.

34) If \$2000 is invested at an annual interest rate r compounded monthly, the amount in the account after 5 years is given by $A = 2,000 \left(1 + \frac{1}{12}r\right)^{60}$. Find the rate of change of the amount A with respect 34) _____

to the interest rate r .

A) $10,000 \left(1 + \frac{1}{12}r\right)^{59}$

B) $120,000 \left(1 + \frac{1}{12}r\right)^{59}$

C) $1000 \left(1 + \frac{1}{12}r\right)^{59}$

D) $12,000 \left(1 + \frac{1}{12}r\right)^{59}$