

Find $f'(x)$.

1) $f(x) = \ln x^6 - 3x^2$

A) $\frac{6}{x} - 3x$

B) $\frac{6}{x} - 6x$

C) $\frac{6}{x^5} - 6x$

D) $\frac{1}{6x} - 6x$

1) _____

2) $f(x) = \ln x^3 - 8e^x + 2x^2$

A) $\frac{3}{x^2} - 8e^x + 4$

B) $\frac{3}{x} - 8xe^{x-1} + 4x$

C) $\frac{3}{x} - 8e^x + 2x$

D) $\frac{3}{x} - 8e^x + 4x$

2) _____

3) $f(x) = 3 \ln x + \ln x^6 + 4e^x$

A) $\frac{3}{x} + \frac{6}{x^5} + 4e^x$

B) $\frac{9}{x} + 4xe^{x-1}$

C) $\frac{9}{x} + 4e^x$

D) $\frac{3}{x} + \frac{6}{x^5} + 4xe^{x-1}$

3) _____

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

4) $y = 8^x$

A) $8 \ln 8$

B) $8^x \ln x$

C) $\frac{8^x}{\ln 8}$

D) $8^x \ln 8$

4) _____

5) $y = 3x^2 - \log_3 x$

A) $3x - \frac{1}{x \ln 3}$

B) $6x + \frac{1}{3 \ln x}$

C) $6x - \frac{1}{x \ln 3}$

D) $6x - \frac{1}{3 \ln x}$

5) _____

6) $y = 5 + 2x^2 - 7^x$

A) $4x - 7 \ln 7$

B) $4x + 7^x \ln 7$

C) $4x - 7^x \ln 7$

D) $4x - 7^x \ln x$

6) _____

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

7) $f(x) = 1 + \ln \frac{5}{x^4}$

A) $\frac{5}{x}$

B) $-\frac{5}{x}$

C) $1 - \frac{4}{x}$

D) $-\frac{4}{x}$

7) _____

Find $f'(x)$.

8) $f(x) = \ln x^5$

A) $5 \ln x^4$

B) $\frac{1}{5x}$

C) $\frac{5}{x}$

D) $\frac{5}{x^4}$

8) _____

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

9) $f(x) = 2e^x$; $x = 0$

A) $y = 2x + 2$

B) $y = 2x$

C) $y = x + 2$

D) $y = 2x - 2$

9) _____

Solve.

10) The resale value R (in dollars) of a company car after t years is estimated to be given by

$R(t) = 22,500(0.84)^t$. What is the rate of depreciation (in dollars per year) after 2 years?

A) $-\$2325/\text{yr}$

B) $-\$1953/\text{yr}$

C) $-\$2768/\text{yr}$

D) $-\$11,004/\text{yr}$

10) _____

Differentiate a product.

11) Find $f'(t)$ for $f(x) = (3x - 4)(4x^3 - x^2 + 1)$

A) $f'(x) = 48x^3 - 19x^2 + 57x + 3$

B) $f'(x) = 12x^3 + 19x^2 - 57x + 3$

C) $f'(x) = 36x^3 + 57x^2 - 19x + 3$

D) $f'(x) = 48x^3 - 57x^2 + 8x + 3$

11) _____

12) Find $f'(x)$ for $f(x) = (2x - 4)(2x^3 - x^2 + 1)$.

A) $f'(x) = 4x^3 - 10x^2 - 30x + 2$

B) $f'(x) = 16x^3 - 30x^2 + 8x + 2$

C) $f'(x) = 16x^3 - 10x^2 + 30x + 2$

D) $f'(x) = 12x^3 + 30x^2 - 10x + 2$

12) _____

Differentiate a quotient.

13) Find $f'(t)$ for $f(x) = \frac{x}{4x - 6}$

A) $-\frac{6}{4x - 6}$

B) $-\frac{6}{(4x - 6)^2}$

C) $\frac{8x - 6}{(4x - 6)^2}$

D) $-\frac{6x}{(4x - 6)^2}$

13) _____

14) Find y' for $y = \frac{x^2}{9 - 2x}$

A) $\frac{-2x^2 + 18x}{(9 - 2x)^2}$

B) $\frac{2x^3 - 4x^2 + 18x}{(9 - 2x)^2}$

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

D) $\frac{-6x^2 + 18x}{(9 - 2x)^2}$

14) _____

Provide an appropriate response.

15) Find $f'(x)$ for $f(x) = (4x^2 + 3x)^2$.

A) $f'(x) = 32x^3 + 36x^2 + 18x$

B) $f'(x) = 64x^3 + 36x^2 + 18x$

C) $f'(x) = 64x^3 + 72x^2 + 18x$

D) $f'(x) = 32x^3 + 36x^2 + 9x$

15) _____

16) Find $\frac{dy}{dx}$ for $y = \ln(3x^3 - x^2)$ 16) _____

A) $\frac{9x - 2}{3x^3 - x}$ B) $\frac{9x - 2}{3x^2 - x}$ C) $\frac{3x - 2}{3x^2 - x}$ D) $\frac{9x - 2}{3x^2}$

17) Find $f'(x)$ for $f(x) = (\ln x)^8$ 17) _____

A) $\frac{1}{(\ln x)^8}$ B) $\frac{1}{x^8}$ C) $8 \ln^7 x$ D) _____ E) $\frac{8 \ln^7 x}{x}$

18) Find $\frac{dy}{dx}$ for $y = 17^{x-1}$ 18) _____

A) $17^{x-1} \ln(17)$ B) $17^{x-1} \ln(17^{x-1})$ C) $17^{x-1} \ln(x)$ D) $17 \ln(17)$

Solve the problem.

19) The concentration of a certain drug in the bloodstream t minutes after swallowing a pill containing the drug can be approximated using the equation $C(t) = \frac{1}{2}(6t + 1)^{-1/2}$, where $C(t)$ is the concentration in arbitrary units and t is in minutes. Find the rate of change of concentration with respect to time at $t = 8$ minutes. 19) _____

A) $-\frac{1}{14}$ units/min B) $-\frac{3}{14}$ units/min
 C) $-\frac{3}{686}$ units/min D) $-\frac{1}{1,372}$ units/min

Solve.

20) A single bacterium divides every 0.5 hour to produce two complete bacteria. If we start with a colony of 6000 bacteria, after t hours there will be $A(t) = 6000 \cdot 4^t$ bacteria. Find $A'(t)$ and $A'(1)$. 20) _____

A) $A'(t) = 6000(\ln 2)2^t$; $A'(1) = 8317$ bacteria
 B) $A'(t) = 6000(\ln 2)4^t$; $A'(1) = 16,635$ bacteria
 C) $A'(t) = 6000(\ln 4)4^t$; $A'(1) = 33,271$ bacteria
 D) $A'(t) = 6000(\ln 4)2^t$; $A'(1) = 16,635$ bacteria

Answer Key

Testname: REVIEW_TEST3

- 1) B
- 2) D
- 3) C
- 4) D
- 5) C
- 6) C
- 7) D
- 8) C
- 9) A
- 10) C
- 11) D
- 12) B
- 13) B
- 14) A
- 15) C
- 16) B
- 17) E
- 18) A
- 19) C
- 20) C