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

Find dy/dx.

1) $y = \frac{5x - 4}{2x^2 + 1}$ 1) _____

A) $\frac{30x^2 - 16x + 5}{(2x^2 + 1)^2}$

B) $\frac{-10x^2 + 16x + 5}{(2x^2 + 1)^2}$

C) $\frac{-10x^2 + 11x + 9}{(2x^2 + 1)^2}$

D) $\frac{10x^3 - 20x^2 + 21x}{(2x^2 + 1)^2}$

2) $y = \ln(\ln 7x)$ 2) _____

A) $\frac{1}{7x}$

B) $\frac{1}{x \ln 7x}$

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

D) $\frac{1}{\ln 7x}$

3) $y = 2xe^x - 2e^x$ 3) _____

A) $2e^x$

B) $2x$

C) $2xe^x$

D) $2xe^x + 4e^x$

4) $y = 3 \sec^5 x$ 4) _____

A) $15 \tan^2 x \sec^5 x$

B) $15 \tan x \sec^5 x$

C) $15 \sec^4 x$

D) $15 \tan^2 x \sec^4 x$

5) $y = (2x - 4)(3x^3 - x^2 + 1)$ 5) _____

A) $6x^3 + 14x^2 - 42x + 2$

B) $24x^3 - 42x^2 + 8x + 2$

C) $24x^3 - 14x^2 + 42x + 2$

D) $18x^3 + 42x^2 - 14x + 2$

6) $y = \frac{x^2}{4 - 9x}$ 6) _____

A) $\frac{4x}{(4 - 9x)^2}$

B) $\frac{9x^3 - 18x^2 + 8x}{(4 - 9x)^2}$

C) $\frac{-27x^2 + 8x}{(4 - 9x)^2}$

D) $\frac{-9x^2 + 8x}{(4 - 9x)^2}$

7) $y = \frac{\sqrt{x} - 8}{\sqrt{x} + 8}$ 7) _____

A) $\frac{8}{x + 8}$

B) $\frac{8}{\sqrt{x}(\sqrt{x} + 8)^2}$

C) $\frac{16}{(x + 8)\sqrt{x} - 64}$

D) $-\frac{8}{\sqrt{x}(\sqrt{x} + 8)^2}$

Find the derivative of the given function.

8) $y = \tan^{-1} \sqrt{7x}$ 8) _____

A) $\frac{1}{1 + 7x}$

B) $\frac{7}{2(1 + 7x)\sqrt{7x}}$

C) $\frac{1}{\sqrt{1 - 7x}}$

D) $\frac{1}{14\sqrt{7x}(1 + 7x)}$

Determine the limit by substitution.

- 9) $\lim_{x \rightarrow 10} \frac{x^2 + 100}{x + 10}$ 9) _____
 A) Does not exist B) 0 C) 10 D) 20

Suppose that the functions f and g and their derivatives with respect to x have the following values at the given values of x . Find the derivative with respect to x of the given combination at the given value of x .

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
3	1	16	8	3
4	-3	3	2	-6

10) _____

$\sqrt{f(x) + g(x)}$ at $x = 3$

- A) $\frac{1}{2\sqrt{17}}$ B) $\frac{11}{2\sqrt{17}}$ C) $\frac{11}{\sqrt{17}}$ D) $-\frac{1}{2\sqrt{17}}$

Determine the limit algebraically, if it exists.

- 11) $\lim_{x \rightarrow 2} \frac{x^2 + 3x - 10}{x - 2}$ 11) _____
 A) 3 B) 0 C) Does not exist D) 7

- 12) $\lim_{x \rightarrow 0} \frac{\frac{1}{x+2} - \frac{1}{2}}{x}$ 12) _____

- A) $\frac{1}{4}$ B) $-\frac{1}{4}$ C) Does not exist D) 0

Find dy/dx .

- 13) $y = 23^{-x}$ 13) _____
 A) -23^{-x} B) 23^{-x} C) $-\ln 23 (23^{-x})$ D) $\ln 23 (23^{-x})$

Find dy/dx by implicit differentiation. If applicable, express the result in terms of x and y .

- 14) $\cos xy + x^4 = y^4$ 14) _____
 A) $\frac{4x^3 - x \sin xy}{4y^3}$ B) $\frac{4x^3 - y \sin xy}{4y^3 + x \sin xy}$ C) $\frac{4x^3 + y \sin xy}{4y^3 - x \sin xy}$ D) $\frac{4x^3 + x \sin xy}{4y^3}$

Find the limit.

- 15) Let $\lim_{x \rightarrow -4} f(x) = -3$ and $\lim_{x \rightarrow -4} g(x) = -10$. Find $\lim_{x \rightarrow -4} [f(x) + g(x)]^2$. 15) _____
 A) 169 B) 7 C) -13 D) 109

Find the limit, if it exists.

- 16) $\lim_{x \rightarrow -\infty} \frac{4x^3 + 2x^2}{x - 5x^2}$ 16) _____
 A) ∞ B) $-\frac{2}{5}$ C) 4 D) $-\infty$

Find the horizontal tangents of the curve.

17) $y = x^4 - 2x^2 + 2$

A) At $x = 0, 1$

B) At $x = 0$

C) At $x = 1, -1,$

D) At $x = 0, 1, -1$

17) _____

Find the extreme values of the function on the interval and where they occur.

18) $g(x) = -x^2 + 9x - 18$ on $3 \leq x \leq 6$

A) Maximum value is $\frac{13}{4}$ at $x = \frac{11}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 3$

B) Maximum value is $\frac{153}{4}$ at $x = \frac{9}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 3$

C) Maximum value is $\frac{9}{4}$ at $x = \frac{9}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 3$

D) Maximum value is $\frac{9}{4}$ at $x = \frac{11}{2}$; minimum value is 0 at $x = 6$ and 0 at $x = 3$

18) _____

Find the value of $(f \circ g)'$ at the given value of x .

19) $f(u) = \frac{1}{u}$, $u = g(x) = 9x - x^2$, $x = 1$

A) $-\frac{7}{64}$

B) $\frac{7}{64}$

C) $\frac{1}{7}$

D) $-\frac{1}{7}$

19) _____

Find the indicated limit.

20) $\lim_{x \rightarrow 0^+} \frac{9x}{|x|}$

A) 0

B) Does not exist

C) -9

D) 9

20) _____

Solve the problem.

21) Assume that a watermelon dropped from a tall building falls $y = 16t^2$ ft in t sec. Find the watermelon's speed at the instant $t = 6$ sec.

A) 194 ft/sec

B) 96 ft/sec

C) 192 ft/sec

D) 97 ft/sec

21) _____

22) At time t , the position of a body moving along the s -axis is $s = t^3 - 15t^2 + 48t$ m. Find the body's acceleration each time the velocity is zero.

A) $a(2) = 18$ m/sec², $a(8) = -18$ m/sec²

B) $a(2) = 0$ m/sec², $a(8) = 0$ m/sec²

C) $a(4) = 24$ m/sec², $a(16) = 4$ m/sec²

D) $a(2) = -18$ m/sec², $a(8) = 18$ m/sec²

22) _____

Suppose u and v are differentiable functions of x . Use the given values of the functions and their derivatives to find the value of the indicated derivative.

23) $u(2) = 9$, $u'(2) = 3$, $v(2) = -3$, $v'(2) = -4$.

$\frac{d}{dx}(uv)$ at $x = 2$

A) 39

B) 45

C) -45

D) -27

23) _____

Find the derivative of the given function.

$$24) y = \frac{1}{\sin^{-1} 4x}$$

24) _____

A) $\frac{\sqrt{1-16x^2}}{4}$

B) $\frac{-4}{\sqrt{1-16x^2}}$

C) $\frac{-1}{(\sin^{-1} 4x)^2}$

D) $\frac{-4}{\sqrt{1-16x^2} (\sin^{-1} 4x)^2}$

Find y'' .

$$25) y = 4 \cot\left(\frac{x}{7}\right)$$

25) _____

A) $-8 \csc\left(\frac{x}{7}\right)$

B) $8 \csc^2\left(\frac{x}{7}\right) \cot\left(\frac{x}{7}\right)$

C) $-\frac{4}{7} \csc^2\left(\frac{x}{7}\right)$

D) $\frac{8}{49} \csc^2\left(\frac{x}{7}\right) \cot\left(\frac{x}{7}\right)$

Answer Key

Testname: AB 1.1-3.1

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