SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) Find y' if $y = (x^3 - 10x + 2)(x^2 + 7x + 1)$. 1) _____

2) Find y' if $y = \dfrac{x^2}{x^3 + 4}$. 2) _____

3) Find the slope of the curve $y = \dfrac{4x}{x + 2}$ at the point where $x = 3$. 3) _____

4) Find the slope of the curve $y = \dfrac{2x + 5}{x - 3}$ at the point (4, 13). 4) _____

5) Find the derivative of $y = (\sqrt[3]{x^5} + \sqrt[7]{x^3} + 1)(5\sqrt{x^9} + 7\sqrt[3]{x^2} + 1)$. 5) _____

6) Find the derivative of $y = \dfrac{7.1x^2 - 9.1x + 2}{2.1x^2 - 1.3x + 5}$. 6) _____

7) 7) _____

Find y' if $y = \sqrt[4]{(2x + 5)^3}$.

8) Find y' if $y = (2x + 1)\sqrt{x - 2}$. 8) _____

9) Suppose that m employees of a company produce a total of q units of a product per day, where $q = 100m - m^2$, and that the demand equation for the product is $p = \dfrac{3000}{q + 100}$. Find the marginal revenue product when $m = 10$. 9) _____

10) 10) _____

Find $\dfrac{dz}{ds}$ where $z = \sqrt[5]{u^7} + \sqrt{u^3} + 1$; $u = 7s^2 - 8s$.

11) 11) _____

Find $\dfrac{dy}{dx}$ where $y = \sqrt[7]{9x^3 - 8x + 5}$.

12) Use the Chain Rule to find $\dfrac{dy}{dx}$ where $y = 7u^{11} - 8u + 5$; $u = 9x^2 - 11x + 5$. 12) _____

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

13) If $f(x) = (x + 1)^2(x + 2)^3$, then $f'(x) =$ 13) _____

A) $(x + 1)(x + 2)^2(5x + 7)$.

B) $(x + 1)(x + 2)(4x + 3)$.

C) $(x + 1)(x + 2)^2(3x + 2)$.

D) $6(x + 1)(x + 2)^2$.

E) $(x + 1)(x + 2)^2(9x + 5)$.

14) If $y = \frac{8(9 - 3x)^5}{5}$, then $y' =$ 14) _____

A) $24(9 - 3x)^4$.

B) $\frac{8(9 - 3x)^4}{25}$.

C) $-\frac{8(9 - 3x)^4}{25}$.

D) $-24(9 - 3x)^4$.

E) $8(9 - 3x)^4$.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

15) Find y' if $y = \ln(2x^2 - 3)$. 15) _____

16) Find y' if $y = \ln\left[(x^2 + 5)^5(3 - 4x)^4\right]$. 16) _____

17) Find y' if $y = \frac{\ln x}{x}$. 17) _____

18) Find y' if $y = \frac{x^2 \ln(2x - 3)}{2x - 3}$. 18) _____

19) Find y' if $y = e^{\sqrt{2x+1}}$. 19) _____

20) Find y' if $y = x^2e^{3x}$. 20) _____

21) Find y' if $y = \frac{xe^x}{x + 1}$. 21) _____

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

22) If $f(x) = \dfrac{x^2 + 1}{e^{3x}}$, then $f'(x) =$ 22) _____

A) $\dfrac{2x - 3x^2 - 3}{e^{6x}}$.

B) $\dfrac{2x - x^2 - 1}{e^{6x}}$.

C) $\dfrac{2x}{e^{3x+2}}$.

D) $\dfrac{2x - x^2 - 1}{e^{3x}}$.

E) $\dfrac{2x - 3x^2 - 3}{e^{3x}}$.

23) If $f(x) = e^{(4x+1)^2}$, then $f'(x) =$ 23) _____

A) $8(4x + 1)e^{(4x+1)^2}$.

B) $e^{2(4x+1)}$.

C) $2(4x + 1)e^{(4x+1)^2}$.

D) $e^{8(4x+1)}$.

E) $(4x + 1)e^{(4x+1)^2 - 1}$.

24) If $y = (x^2 + 5x - 1)e^{2x}$, then $y' =$ 24) _____

A) $(3x^2 - 10x + 7)e^{2x}$.

B) $(2x + 5)3^{2x}$.

C) $\dfrac{(2x + 5)e^{2x-1}}{2x}$.

D) $(x^2 + 7x + 4)e^{2x}$.

E) $(2x^2 + 12x + 3)e^{2x}$.

Answer Key
Testname: 5701–STUDY–CHAIN–_N_E

1) $(x^3 - 10x + 2)(2x + 7) + (x^2 + 7x + 1)(3x^2 - 10) = 5x^4 + 28x^3 - 27x^2 - 136x + 14$

2) $\dfrac{8x - x^4}{(x^3 + 4)^2}$

3) $\dfrac{8}{25}$

4) -11

5) $\left(\dfrac{5}{3}x^{2/3} + \dfrac{3}{7}x^{-4/7}\right)(5x^{9/2} + 7x^{2/3} + 1) + (x^{5/3} + x^{3/7} + 1)\left(\dfrac{45}{2}x^{7/2} + \dfrac{14}{3}x^{-1/3}\right)$

6) $\dfrac{dy}{dx} = \dfrac{9.88x^2 + 62.6x - 42.9}{(2.1x^2 - 1.3x + 5)^2}$

7) $\dfrac{3}{2}(2x + 5)^{-1/4}$

8) $\dfrac{2x + 1}{2\sqrt{x - 2}} + 2\sqrt{x - 2}$

9) 24

10) $\left(\dfrac{7}{5}u^{2/5} + \dfrac{3}{2}u^{1/2}\right)(14s - 8) = \left[\dfrac{7}{5}(7s^2 - 8s)^{2/5} + \dfrac{3}{2}(7s^2 - 8s)^{1/2}\right](14s - 8)$

11) $\dfrac{1}{7}(9x^3 - 8x + 5)^{-6/7}(27x^2 - 8)$

12) $(77u^{10} - 8)(18x - 11) = \left[77(9x^2 - 11x + 5)^{10} - 8\right](18x - 11)$

13) A

14) D

15) $\dfrac{4x}{(2x^2 - 3)}$

16) $\dfrac{10x}{x^2 + 5} - \dfrac{16}{3 - 4x}$

17) $\dfrac{1 - \ln x}{x^2}$

18) $\dfrac{2x^2 + 2x(2x - 3)\ln(2x - 3) - 2x^2 \ln(2x - 3)}{(2x - 3)^2}$

19) $\dfrac{e^{\sqrt{2x+1}}}{\sqrt{2x + 1}}$

20) $x(3x + 2)e^{3x}$

21) $\dfrac{e^x(x^2 + x + 1)}{(x + 1)^2}$

22) E

23) A

24) E