

Name: _____

Class: _____

Date: _____

ID: A

MAC 2233 Chapter 4 Review for the test

Multiple Choice

Identify the choice that best completes the statement or answers the question.

_____ 1. Find the derivative of the function.

$$g(x) = 5x^{-3} + 6x^{-6}$$

- a. $g'(x) = 5x^{-3} + 6x^{-6}$
- b. $g'(x) = -15x^{-3} - 36x^{-6}$
- c. $g'(x) = 15x^{-4} + 36x^{-7}$
- d. $g'(x) = -5x^{-4} - 6x^{-7}$
- e. $g'(x) = -15x^{-4} - 36x^{-7}$

_____ 2. Find the derivative of the function.

$$r(x) = \frac{2x}{7} - \frac{x^{0.3}}{2} + \frac{4}{7x^{1.3}} - 4$$

- a. $r'(x) = \frac{2}{7} - \frac{0.3}{2x^{0.3}} - \frac{5.2}{7x^{1.3}}$
- b. $r'(x) = \frac{2}{7} - \frac{0.3x^{0.7}}{2} + \frac{5.2x^{2.3}}{7}$
- c. $r'(x) = \frac{2}{7} - \frac{0.3x^{1.3}}{2} - \frac{5.2}{7x^{0.3}}$
- d. $r'(x) = \frac{2}{7} - \frac{0.3}{2x^{0.7}} + \frac{5.2}{7x^{2.3}}$
- e. $r'(x) = \frac{2}{7} - \frac{0.3}{2x^{0.7}} - \frac{5.2}{7x^{2.3}}$

_____ 3. Find the derivative of the function.

$$s(x) = 2\sqrt{x} + \frac{39}{\sqrt{x}}$$

a. $s'(x) = \frac{1}{\sqrt{x}} + \frac{19.5}{x\sqrt{x}}$

b. $s'(x) = \frac{1}{\sqrt{x}} + \frac{19.5}{x\sqrt{x}}$

c. $s'(x) = \frac{2}{\sqrt{x}} - \frac{39}{x\sqrt{x}}$

d. $s'(x) = \frac{1}{\sqrt{x}} - \frac{19.5}{x\sqrt{x}}$

e. $s'(x) = \frac{1}{\sqrt{x}} + \frac{39}{x\sqrt{x}}$

_____ 4. Find the slope of the tangent to the graph of the given function $f(x) = 2x^3$ at the point $(-3, -54)$.

a. $f'(-3) = 54$

b. $f'(-3) = -162$

c. $f'(-3) = -18$

d. $f'(-3) = 18$

e. $f'(-3) = 0$

_____ 5. Find the slope of the tangent to the graph of the given function at the indicated point.

$$g(t) = \frac{7}{t^3}, (0.5, 56)$$

a. $g'(0.5) = 112,892$

b. $g'(0.5) = -336$

c. $g'(0.5) = 336$

d. $g'(0.5) = -672$

e. $g'(0.5) = -168$

_____ 6. Find all the values of x (if any) where the tangent line to the graph of the given equation is horizontal.

$$y = 4x^2 + 13x + 13$$

a. $x = 6.5$

b. $x = 1.63$

c. $x = -6.5$

d. $x = -1.63$

e. $x = 0$

_____ 7. Find the derivative of the function.

$$h(x) = x(10 + 7x)$$

- a. $17x$
- b. $10 + 14x$
- c. $14 + x$
- d. 7
- e. $10x$

_____ 8. Calculate $\frac{dy}{dx}$. You need not expand your answer.

$$y = (10x^2 + x)(x - x^2)$$

- a. $(20x + 1)(1 - x) + (x - x^2)(10x^2 + x)$
- b. $-40x^2 + 22x + 1$
- c. $(20x + 1)(x - x^2) + (1 - 2x)(10x^2 + x)$
- d. $(20x + 1)(x - x^2) - (1 - 2x)(10x^2 - x)$
- e. $(20x + 1)(1 - x) + (x - 2x^2)(10x^2 + x)$

_____ 9. Calculate $\frac{dy}{dx}$. You need not expand your answer.

$$y = \left(\frac{x}{3.6} + \frac{3.6}{x} \right) (x^2 + 4)$$

- a. $2x$
- b. $2x \left(\frac{1}{3.6} - \frac{3.6}{x^2} \right) + \left(\frac{x}{3.6} + \frac{3.6}{x} \right) (x^2 + 4)$
- c. $2x \left(\frac{1}{3.6} - \frac{3.6}{x^2} \right)$
- d. $\left(\frac{1}{3.6} - \frac{3.6}{x^2} \right) (x^2 + 4) + 2x \left(\frac{x}{3.6} + \frac{3.6}{x} \right)$
- e. $\left(\frac{1}{3.6} - \frac{3.6}{x^2} \right) (x^2 + 4) - 2x \left(\frac{x}{3.6} + \frac{3.6}{x} \right)$

_____ 10. Calculate $\frac{dy}{dx}$.

$$y = x^2(2x + 3)(5x + 5)$$

- a. $25x^2 + (2x + 3)(5x + 5)$
- b. $40x^3 + 75x^2 + 30x$
- c. $65x^2 + (2x + 75)(5x + 5)$
- d. $2x^3 + 75x^2 + 30x$
- e. $2x^2 + 75x + 30$

_____ 11. Calculate $\frac{dy}{dx}$.

$$y = \left(\sqrt{x} + 4\right)\left(\sqrt{x} + \frac{4}{x^2}\right)$$

- a. $\frac{1}{\sqrt{x}}\left(\sqrt{x} + \frac{4}{x^2}\right) + \left(\frac{1}{\sqrt{x}} - \frac{8}{x}\right)\left(\sqrt{x} + 4\right)$
- b. $\frac{1}{2\sqrt{x}}\left(\sqrt{x} + \frac{4}{x^2}\right) + \left(\frac{1}{2\sqrt{x}} + \frac{8}{x^3}\right)\left(\sqrt{x} + 4\right)$
- c. $\frac{1}{2\sqrt{x}}\left(\sqrt{x} + \frac{4}{x^2}\right) + \left(\frac{1}{2\sqrt{x}} - \frac{8}{x^3}\right)\left(\sqrt{x} + 4\right)$
- d. $\frac{\sqrt{x}}{2}\left(\sqrt{x} + \frac{4}{x^2}\right) + \left(\frac{\sqrt{x}}{2} - \frac{8}{x^3}\right)\left(\sqrt{x} + 4\right)$
- e. $\frac{1}{2\sqrt{x}}\left(\sqrt{x} + \frac{4}{x^2}\right) + \left(\frac{1}{2\sqrt{x}} - 8x\right)\left(\sqrt{x} + 4\right)$

_____ 12. Calculate $\frac{dy}{dx}$. You need not expand your answer.

$$y = \frac{5x + 5}{4x - 1}$$

- a. $\frac{5(4x - 1) + 4(5x + 5)}{(4x - 1)^2}$
 b. $\frac{5(4x - 1) - 4(5x + 5)}{(4x - 1)^2}$
 c. $\frac{5(4x - 1) + 4(5x + 5)}{4x - 1}$
 d. $5(4x - 1) - 4(5x + 5)$
 e. 1.25

_____ 13. Calculate $\frac{dy}{dx}$. You need not expand your answer.

$$y = \frac{2x - 3}{(x - 5)(x - 1)(x - 4)}$$

- a. $\frac{2(x - 5)(x - 1)(x - 4) + (3x^2 - 20x + 10)(2x - 3)}{((x - 5)(x - 1)(x - 4))^2}$
 b. $\frac{2}{3x^2 - 20x + 10}$
 c. $\frac{2(x - 5)(x - 1)(x - 4) - (3x^2 - 20x + 10)(2x - 3)}{(x - 5)(x - 1)(x - 4)}$
 d. $\frac{2(x - 5)(x - 1)(x - 4) - (3x^2 - 20x + 29)(2x - 3)}{((x - 5)(x - 1)(x - 4))^2}$
 e. $\frac{2(x - 5)(x - 4) - (3x^2 - 20x + 29)}{((x - 5)(x - 4))^2}$

____ 14. Compute the derivative.

$$\frac{d}{dx} \left[(x^3 + 3x)(x^2 - x) \right] \Big|_{x=2}$$

- a. 92
- b. 36
- c. 59
- d. 72
- e. 78

____ 15. Calculate the derivative of the function.

$$g(x) = (2x^2 + 2x + 3)^{-3}$$

- a. $g'(x) = -3(4x + 2)(2x^2 + 2x + 3)^{-4}$
- b. $g'(x) = (-6x^2 + 6x + 9)^{-4}$
- c. $g'(x) = -3(4x + 2)(2x^2 + 2x + 3)$
- d. $g'(x) = -3(2x^2 + 2x + 3)^{-4}$
- e. $g'(x) = -12(2x^2 + 2x + 3)^{-4}$

____ 16. Calculate the derivative of the function.

$$s(x) = \left(\frac{6x + 7}{5x - 2} \right)^5$$

- a. $s'(x) = \left(\frac{6x + 7}{5x - 2} \right)^4 \frac{47}{(5x - 2)^2}$
- b. $s'(x) = -5 \left(\frac{6x + 7}{5x - 2} \right)^4 \frac{12}{(5x - 2)^2}$
- c. $s'(x) = -5 \left(\frac{6x + 7}{5x - 2} \right)^4 \frac{47x}{(5x - 2)^2}$
- d. $s'(x) = 5 \left(\frac{6x + 7}{5x - 2} \right)^4$
- e. $s'(x) = -5 \left(\frac{6x + 7}{5x - 2} \right)^4 \frac{47}{(5x - 2)^2}$

_____ 17. Find the indicated derivative. The independent variable is a function of t .

$$y = x^{0.5}(1+x); \frac{dy}{dt} = ?$$

a. $\frac{dy}{dt} = (1.5x^{0.5}) \frac{dx}{dt}$

b. $\frac{dy}{dt} = (0.5x^{-0.5}) \frac{dx}{dt}$

c. $\frac{dy}{dt} = (0.5x^{-0.5} + 2.5x^{0.5}) \frac{dx}{dt}$

d. $\frac{dy}{dt} = (0.5x^{-0.5} + 1.5x^{0.5}) \frac{dx}{dt}$

e. $\frac{dy}{dt} = (0.5x^{0.5} + 2.5x^{0.5}) \frac{dx}{dt}$

_____ 18. Find the indicated derivative.

$$y = 8x^3 + \frac{11}{x}, x = 5 \text{ when } t = 1, \left. \frac{dx}{dt} \right|_{t=1} = 11; \left. \frac{dy}{dt} \right|_{t=1} = ?$$

Please round the answer to the nearest hundredth.

a. $\left. \frac{dy}{dt} \right|_{t=1} = 2175.80$

b. $\left. \frac{dy}{dt} \right|_{t=1} = 599.56$

c. $\left. \frac{dy}{dt} \right|_{t=1} = 1315.16$

d. $\left. \frac{dy}{dt} \right|_{t=1} = 6595.16$

e. $\left. \frac{dy}{dt} \right|_{t=1} = 13151.60$

____ 19. Find the derivative of the following function.

$$f(x) = \ln(5x - 9)$$

a. $\frac{1}{5x - 9}$

b. $\frac{5}{5x - 9}$

c. $\frac{9}{5x - 9}$

d. $\frac{45}{5x - 9}$

e. none of these

____ 20. Find the derivative of the following function.

$$f(x) = \log 74x$$

a. $\frac{1}{4x \ln(7)}$

b. $\frac{7}{x \ln(4)}$

c. $\frac{1}{x \ln(7)}$

d. $\frac{4}{x \ln(7)}$

e. none of these

____ 21. Find the derivative of the function.

$$f(x) = (x^9 + 8) \ln x$$

a. $\frac{x^9(9 + 9 \ln x) + 8}{x}$

b. $\frac{x^8(1 + 9 \ln x) + 8}{x}$

c. $\frac{x^9(1 + 9 \ln x) + 8}{x}$

d. $\frac{x^9(1 + \ln x) + 8}{x}$

e. none of these

_____ 22. Find the derivative of the function.

$$h(x) = \ln [(-2x + 2)(7x + 5)]$$

- a. $\frac{7}{(-2x + 2)} + \frac{2}{(7x + 5)}$
- b. $\frac{7}{(-2x + 2)} - \frac{2}{(7x + 5)}$
- c. $\frac{-2}{(-2x + 2)} + \frac{7}{(7x + 5)}$
- d. $\frac{1}{(-2x + 2)} + \frac{1}{(7x + 5)}$
- e. $\frac{1}{(-2x + 2)} - \frac{1}{(7x + 5)}$

_____ 23. Find the derivative of the function.

$$f(x) = \ln \left| \frac{(5x + 3)^6}{(4x + 2)^9(8x + 9)} \right|$$

- a. $\frac{30}{5x + 3} + \frac{36}{4x + 2} + \frac{8}{8x + 9}$
- b. $\frac{30}{5x + 3} - \frac{36}{4x + 2} - \frac{8}{8x + 9}$
- c. $\frac{5}{(5x + 3)^6} - \frac{4}{(4x + 2)^9} - \frac{8}{8x + 9}$
- d. $\frac{5}{(5x + 3)^6} + \frac{4}{(4x + 2)^9} + \frac{8}{8x + 9}$
- e. none of these

____ 24. Find the derivative of the function.

$$r(x) = [\ln(x^7)]^4$$

a. $\frac{28[\ln(x^6)]^3}{x^7}$

b. $\frac{28[\ln(x^7)]^3}{x^7}$

c. $\frac{28[\ln(x^7)]^3}{x}$

d. $\frac{28[\ln(x^7)]^4}{x^7}$

e. none of these

____ 25. Find the derivative of the function.

$$f(x) = e^{5x^7} \ln 4x$$

a. $35e^{5x^7} x^6 \ln 4x + \frac{e^{5x^7}}{x}$

b. $35e^{5x^7} x^6 \ln 4x + \frac{e^{5x^7}}{4}$

c. $35e^{5x^6} x^6 \ln 4x + \frac{e^{5x^7}}{x}$

d. $35e^{5x^7} x^7 \ln 4x + \frac{4e^{5x^7}}{x}$

e. $7e^{5x^7} x^6 \ln 4x + \frac{4e^{5x^7}}{x}$

_____ 26. Find the derivative of the function.

$$h(x) = e^{5x^2 - 2x + \frac{1}{x}}$$

- a. $\frac{10x^2 - 2x - 1}{x} e^{5x^2 - 2x + \frac{1}{x}}$
 b. $\frac{10x^3 - 2x^2 - 1}{x^2} e^{5x^2 - 2x + \frac{1}{x}}$
 c. $\frac{5x^3 - 4x^2 - 1}{x} e^{5x^2 - 2x + \frac{1}{x}}$
 d. $\frac{5x^3 - 4x^2 - 1}{x^2} e^{5x^2 - 2x + \frac{1}{x}}$
 e. none of these

_____ 27. Find the derivative of the function.

$$\frac{e^{-10x}}{10xe^{10x}}$$

- a. $-\frac{20x - 1}{10x^2 e^{20x}}$
 b. $-\frac{20x + 1}{x^2 e^{20x}}$
 c. $\frac{20x + 1}{10x^2 e^{20x}}$
 d. $-\frac{20x + 1}{10x^2 e^{20x}}$
 e. none of these

_____ 28. Find $\frac{dy}{dx}$ using implicit differentiation.

$$3x + 4y = 10$$

- a. $-\frac{4}{3}$
 b. -3
 c. $-\frac{3}{4}$
 d. 0
 e. -4

Name: _____

ID: A

_____ 29. Find $\frac{dy}{dx}$ using implicit differentiation.

$$7x + 5y = xy$$

a. $\frac{x-5}{7-y}$

b. $\frac{7-y}{x-5}$

c. $5-y$

d. $x-7$

e. $\frac{7-x}{y-5}$

_____ 30. Find $\frac{dy}{dx}$ using implicit differentiation.

$$y \ln x + y = 10$$

a. $-\frac{y}{x(\ln x + 1)}$

b. $-\frac{x}{y(\ln y + 1)}$

c. $\frac{y}{x \ln x}$

d. $-\frac{1}{x(\ln x + 1)}$

e. $\frac{y}{x(\ln x + 1)}$

_____ 31. Find $\frac{dy}{dx}$ using implicit differentiation.

$$\frac{xy}{8} - y^2 = 5$$

a. $\frac{1}{\sqrt{16xy}}$

b. $\frac{y}{16x - y}$

c. $16y - 8x$

d. $\frac{1}{8y - x}$

e. $\frac{y}{16y - x}$

_____ 32. Find $\frac{dx}{dy}$ using implicit differentiation.

$$(xy)^2 + y^2 = 3$$

a. $2y + 2x$

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

c. $-\frac{x}{y}$

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

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

_____ 33. Find $\frac{dy}{dx}$ using implicit differentiation.

$$xe^y - ye^x = 10$$

- a. $\frac{y-1}{x-1}$
- b. $\frac{xe^x + e^y}{ye^y + e^x}$
- c. $\frac{xe^y - e^x}{ye^x - e^y}$
- d. $\frac{ye^x - e^y}{xe^y - e^x}$
- e. $\frac{ye^y + e^x}{xe^y - e^x}$

_____ 34. Find $\frac{dy}{dx}$ using implicit differentiation.

$$\frac{e^x}{y^2} = 12 + e^y$$

- a. $\frac{y}{2+y^3}$
- b. $\frac{ye^x}{2e^x + y^3e^y}$
- c. $\frac{2e^x + y^3e^y}{ye^x}$
- d. $\frac{ye^x}{12e^x + 3y^2e^y}$
- e. $\frac{2ye^x}{e^x + ye^y}$

_____ 35. Find $\frac{dy}{dx}$ using implicit differentiation.

$$\ln(20 + e^{xy}) = y$$

a. $x + y$

b. $\frac{1}{20 + e^{xy}(1-x)}$

c. $\frac{ye^{xy}}{20 + e^{xy}}$

d. $\frac{y}{1-x}$

e. $\frac{ye^{xy}}{20 + e^{xy}(1-x)}$

_____ 36. Use the shortcut rules to calculate the derivative of the given function.

$$f(x) = 8x^{2.5}$$

a. $f(x) = 20x$

b. $f(x) = 8x^{2.5}$

c. $f(x) = 20x^{1.5}$

d. $f(x) = 20x^{2.5}$

e. $f(x) = 8x^{1.5}$

Short Answer

37. Find the derivative of the function.

$$s(x) = 7\sqrt{x} + \frac{35}{\sqrt{x}}$$

38. Find the derivative of the function.

$$k(x) = \frac{6x^8 - 10x^9}{x^3}$$

39. Given.

$$\lim_{x \rightarrow 8} \frac{x^2 - 16x + 64}{x^2 - 8x}$$

Say whether L'Hospital's rule applies.

If it does, use it to evaluate the given limit. If not, use some other method.

40. Given.

$$\lim_{x \rightarrow -2} \frac{x^2 + 14x + 24}{x^2 + 2x}$$

Say whether L'Hospital's rule applies.

If it does, use it to evaluate the given limit. If not, use some other method.

**MAC 2233 Chapter 4 Review for the test
Answer Section****MULTIPLE CHOICE**

1. ANS: E PTS: 1
2. ANS: E PTS: 1
3. ANS: D PTS: 1
4. ANS: A PTS: 1
5. ANS: B PTS: 1
6. ANS: D PTS: 1
7. ANS: B PTS: 1
8. ANS: C PTS: 1
9. ANS: D PTS: 1
10. ANS: B PTS: 1
11. ANS: C PTS: 1
12. ANS: B PTS: 1
13. ANS: D PTS: 1
14. ANS: D PTS: 1
15. ANS: A PTS: 1
16. ANS: E PTS: 1
17. ANS: D PTS: 1
18. ANS: D PTS: 1
19. ANS: B PTS: 1
20. ANS: C PTS: 1
21. ANS: C PTS: 1
22. ANS: C PTS: 1
23. ANS: B PTS: 1
24. ANS: C PTS: 1
25. ANS: A PTS: 1
26. ANS: B PTS: 1
27. ANS: D PTS: 1
28. ANS: C PTS: 1
29. ANS: B PTS: 1
30. ANS: A PTS: 1
31. ANS: E PTS: 1
32. ANS: B PTS: 1
33. ANS: D PTS: 1
34. ANS: B PTS: 1
35. ANS: E PTS: 1
36. ANS: C PTS: 1

SHORT ANSWER

37. ANS:

$$\frac{3.5}{\sqrt{x}} - \frac{17.5}{x^{1.5}}$$

PTS: 1

38. ANS:

$$30x^4 - 60x^5$$

PTS: 1

39. ANS:

yes; 0

PTS: 1

40. ANS:

yes; -5

PTS: 1