

MAC 2311 Chapter 2.1 - 2.5 Review Exercises/Practice for the Exam**Multiple Choice**

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

- _____ 1. Use the definition of the derivative to find $f'(3)$, where $f(x) = x^3 - 2x$.
- 25
 - 25
 - 27
 - 18
 - does not exist
- _____ 2. If the tangent line to $y = f(x)$ at $(8, 4)$ passes through the point $(4, -32)$, find $f'(8)$.
- $f'(8) = 29$
 - $f'(8) = 19$
 - $f'(8) = 9$
 - $f'(8) = 34$
 - $f'(8) = -9$
- _____ 3. Find an equation of the tangent line to the parabola $y = 5x^3$ at the point $(-5, -145)$.
- $y = 375x - 1730$
 - $y = 395x - 1730$
 - $y = 375x + 1730$
 - $y = 395x + 1730$
 - $y = 395x - 1730$
- _____ 4. Find the slope of the tangent line to the curve $y = 5x^2$ at the point $(-4, 22)$.
- 40
 - 40
 - 4
 - 4
 - 25

_____ 5. A turkey is removed from the oven when its temperature reaches $175^{\circ}F$ and is placed on a table in a room where the temperature is $70^{\circ}F$. After 10 minutes the temperature of the turkey is $161^{\circ}F$ and after 20 minutes it is $149^{\circ}F$. Use a linear approximation to predict the temperature of the turkey after 30 minutes.

- a. $131^{\circ}F$
- b. $136^{\circ}F$
- c. $126^{\circ}F$
- d. $141^{\circ}F$
- e. $146^{\circ}F$

_____ 6. The cost (in dollars) of producing x units of a certain commodity is

$$C(x) = 4,280 + 13x + 0.03x^2.$$

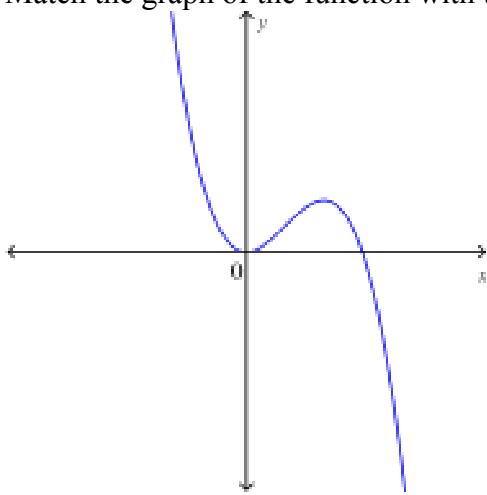
Find the average rate of change with respect to x when the production level is changed from $x = 102$ to $x = 122$.

- a. 23.02
- b. 14.42
- c. 29.94
- d. 16.42
- e. 19.72

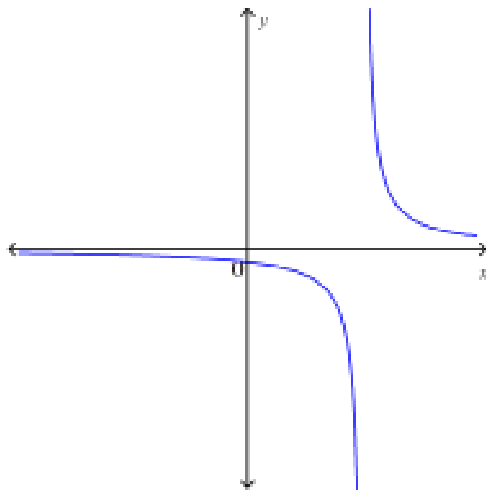
_____ 7. At what point is the function $f(x) = |3 - x|$ not differentiable.

- a. 0
- b. 3
- c. 1
- d. -1
- e. -3

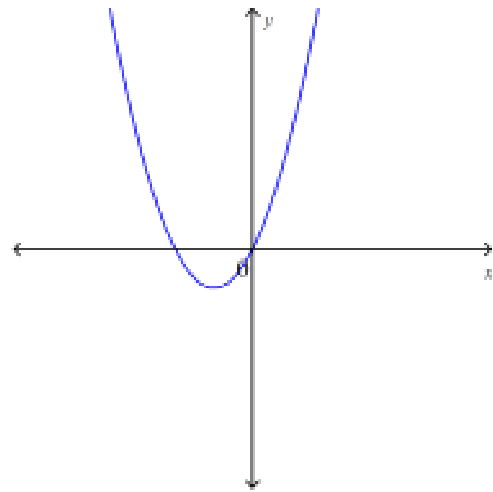
8. Match the graph of the function with the graph of its derivative.



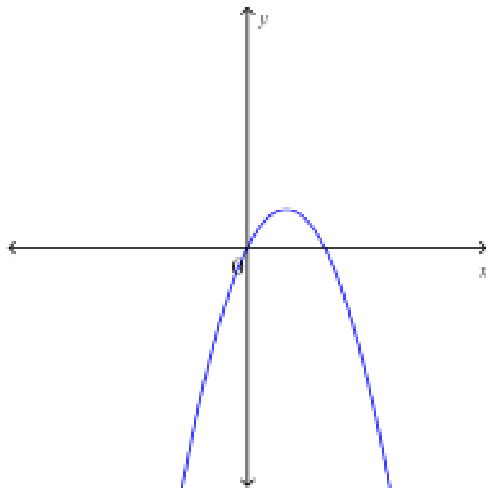
a.



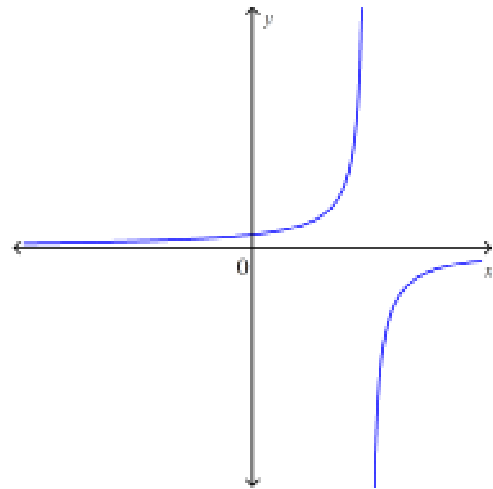
c.



b.



d.



_____ 9. Differentiate.

$$K(x) = (3x^5 + 1)(x^6 - 4x)$$

- a. $15x^4(x^6 - 4x) + (3x^5 + 1)(6x^5 - 4)$
- b. $(x^6 - 4x) + (3x^5 + 1)$
- c. $15x^4(6x^5 - 4) + (3x^5 + 1)(x^6 - 4x)$
- d. $15x^4(6x^5) + (3x^5)(x^6 - 4x)$
- e. $(3x^5 + 1)(x^6 - 4x) + 15x^4(6x^5 - 4) + 1$

_____ 10. Suppose that $F(x) = f(g(x))$ and $g(14) = 2$, $g'(14) = 4$, $f'(14) = 15$, and $f'(2) = 13$.

Find $F'(14)$.

- a. 140
- b. 20
- c. 24
- d. 52
- e. 17

_____ 11. The equation of motion is given for a particle, where s is in meters and t is in seconds. Find the acceleration after 5 seconds.

$$s = t^3 - 3t$$

- a. 31 m/s^2
- b. 32 m/s^2
- c. 28 m/s^2
- d. 29 m/s^2
- e. 30 m/s^2

_____ 12. Find the derivative of the function.

$$h(t) = \frac{t^8 - t^5 + 6t^2}{5t^2}$$

a. $\frac{6}{5}t^6 - \frac{3}{5}t^3$

b. $\frac{6}{5}t^5 - \frac{3}{5}t^2 + \frac{6}{5}$

c. $\frac{6}{5}t^5 - \frac{3}{5}t^2$

d. $\frac{6}{5}t^6 - \frac{3}{5}t^3 + \frac{6}{5}$

_____ 13. Find the point(s) on the graph of the function at which the tangent line has the indicated slope.

$$g(x) = \frac{1}{3}x^3 + 3x^2 - 29x - 3 \quad m_{\text{tan}} = -2$$

a. $\left(-2, \frac{193}{3}\right)$

b. $(3, -2)$ and $(-9, -2)$

c. $(-2, -37)$

d. $(3, -54)$ and $(-9, 258)$

_____ 14. Use the Quotient Rule to find the derivative of the function.

$$P(t) = \frac{1-t}{7-8t}$$

a. $\frac{1}{8(7-8t)}$

b. $\frac{1}{8}$

c. $\frac{1}{(7-8t)}$

d. $\frac{1}{(7-8t)^2}$

_____ 15. Find the derivative of the function.

$$f(x) = (x^2 + 1) \left(\frac{9x - 1}{7x + 1} \right)$$

a. $\frac{63x^3 + 135x^2 + 49x + 9}{7(7x + 1)^2}$

b. $\frac{63x^3 + 135x^2 + 49x + 9}{7(7x + 1)}$

c. $\frac{126x^3 + 20x^2 - 2x + 16}{(7x + 1)^2}$

d. $\frac{126x^3 + 20x^2 - 2x + 16}{(7x + 1)}$

_____ 16. If $f(0) = 4$, $f'(0) = 2$, $g(0) = 3$ and $g'(0) = -5$, find $(f+g)'(0)$.

- a. -6
- b. -3
- c. -1
- d. -2
- e. -4
- f. -5

_____ 17. Differentiate the function.

$$B(y) = cy^{-4}$$

- a. $B'(y) = -\frac{5c}{y^4}$
- b. $B'(y) = -\frac{4c^5}{y}$
- c. $B'(y) = \frac{5c}{y^4}$
- d. $B'(y) = -\frac{4c}{y^5}$
- e. $B'(y) = -\frac{c}{4y^5}$

_____ 18. Find the limit.

$$\lim_{\theta \rightarrow 0} 6 \frac{\cos(\cos \theta)}{\sec \theta}$$

- a. 0
- b. 2
- c. 1
- d. $6 \cos 1$
- e. $6 \sin 1$

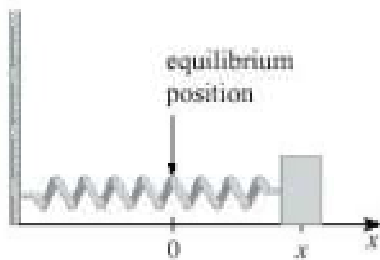
_____ 19. Find the derivative of the function.

$$f(x) = 2 \cos x - 2x - 8$$

- a. $-2 \sin x - 2$
- b. $-2 \cos x - 2$
- c. $2 \cos x - 2$
- d. $2 \sin x - 2$

_____ 20. A mass on a spring vibrates horizontally on a smooth level surface (see the figure). Its equation of motion is $x(t) = 5 \sin t$, where t is in seconds and x in centimeters.

Find the velocity at time t .



- a. $v(t) = \sin 5t$
- b. $v(t) = 5 \cos t$
- c. $v(t) = 2 \cos 3t$
- d. $v(t) = 5 \sin 3t$
- e. $v(t) = \cos 5t$

_____ 21. Find f' in terms of g' .

$$f(x) = [g(x)]^4$$

- a. $f'(x) = 4g(x)$
- b. $f'(x) = 4[g(x)]^3 g'(x)$
- c. $f'(x) = 4[g'(x)]^3$
- d. $f'(x) = 4[gx][xg' + g]$
- e. $f'(x) = 4g'(x)$

_____ 22. Find the derivative of the function.

$$y = (3x + 1)^4(x^4 - 6)^6$$

a. $y' = (24x + 12)(3x + 1)^4(x^4 - 6)^6$

b. $y' = (x + 1)^3(x^4 - 6)^6 + 24x(3x + 1)^4(x^3 - 6)^5$

c. $y' = 12(3x + 1)^3(x^4 - 6)^6 + 24x^3(3x + 1)^4(x^4 - 6)^5$

d. $y' = 12(3x + 1)^3(x^4 - 6)^6 + 24x(3x + 1)^4(x^4 - 6)^5$

e. $y' = 12(3x + 1)^3(x^4 - 6)^6 + (3x + 1)^4(x^4 - 6)^5$

_____ 23. Find f' in terms of g' .

$$f(x) = x^5g(x)$$

a. $f'(x) = 5x^4 + g'(x)$

b. $f'(x) = x^5g(x) + 5x^5g'(x)$

c. $f'(x) = 5x^4g(x) + x^5g'(x)$

d. $f'(x) = 5x^4g'(x)$

e. $f'(x) = 5xf'(x) + 5xg'(x)$

_____ 24. Suppose that $F(x) = f(g(x))$ and $g(14) = 2$, $g'(14) = 5$, $f'(14) = 15$, and $f'(2) = 16$.

Find $F'(14)$.

a. 20

b. 80

c. 24

d. 140

e. 17

_____ 25. If $f(t) = \sqrt{9t+1}$, find $f''(5)$.

a. -0.065

b. -0.033

c. 0.015

d. -0.22

e. 0.044

_____ 26. Find the derivative of the function.

$$f(x) = (4x + 9)^9$$

- a. $36(4x + 9)^8$
- b. $9(4x + 9)^8$
- c. $9x(4x + 9)^8$
- d. $36x(4x + 9)^8$

_____ 27. Find the derivative of the function.

$$g(t) = \tan(\cos 2t)$$

- a. $-2 \sin 2t \sec^2(\cos 2t)$
- b. $2 \sin 2t \sec^2(\cos 2t)$
- c. $\sin 2t \sec^2(\cos 2t)$
- d. $-\sin 2t \sec^2(\cos 2t)$

_____ 28. If $y = 2x^2 + 7x$ and $\frac{dx}{dt} = 6$, find $\frac{dy}{dt}$ when $x = 4$.

- a. 348
- b. 108
- c. 258
- d. 308
- e. None of these

Multiple Response

Identify one or more choices that best complete the statement or answer the question.

_____ 1. Find equations of the tangent lines to the curve $y = \frac{x - 10}{x + 10}$ that are parallel to the line $x - y = 10$.

- a. $x - y = -4.5$
- b. $x - y = -2$
- c. $x - y = -12.5$
- d. $x - y = -19.75$
- e. $x - y = -15$

- _____ 2. If $f(x) = 6 \cos x + \sin^2 x$, find $f'(x)$ and $f''(x)$.
- $f''(x) = -6 \cos(2x) + 2 \cos(x)$
 - $f'(x) = -6 \sin(x) + \sin(2x)$
 - $f'(x) = -6 \sin(2x) + \sin(x)$
 - $f''(x) = -6 \cos(x) + 2 \cos(2x)$
 - $f''(x) = -2 \cos(2x) + 6 \cos(x)$

Numeric Response

1. Find the derivative of the function.

$$f(x) = 14 - 4x + 5x^2$$

2. Find an equation of the tangent line to the curve.

$$y = \frac{\sqrt{x}}{x+6} \text{ at } (4, 0.6)$$

3. Find the first and the second derivatives of the function.

$$y = \frac{x}{4-x}$$

4. If $h(2) = 16$ and $h'(2) = -2$, find $\left. \frac{d}{dx} \left(\frac{h(x)}{x} \right) \right|_{x=2}$

5. Differentiate.

$$Y(u) = (u^{-2} + u^{-3})(4u^5 - u^3)$$

6. In this exercise we estimate the rate at which the total personal income is rising in the Richmond-Petersburg, Virginia, metropolitan area. In 1999, the population of this area was 961,600, and the population was increasing at roughly 9,400 people per year. The average annual income was \$30,591 per capita, and this average was increasing at about \$1,300 per year (a little above the national average of about \$1,225 yearly). Use the Product Rule and these figures to estimate the rate at which total personal income was rising in the Richmond-Petersburg area in 1999.
7. Find a third-degree polynomial Q such that $Q(1) = 8$, $Q'(1) = 7$, $Q''(1) = 14$, and $Q'''(1) = 18$.

8. Differentiate.

$$g(x) = x^8 \cos x$$

9. Differentiate.

$$y = \frac{\tan x - 2}{\sec x}$$

10. Find the limit.

$$\lim_{\theta \rightarrow 0} 4 \frac{\sin(\sin 4\theta)}{\sec 4\theta}$$

11. The displacement of a particle on a vibrating string is given by the equation
- $s(t) = 8 + \frac{1}{7} \sin(12\pi t)$
- , where
- s
- is measured in centimeter and
- t
- in seconds. Find the velocity of the particle after
- t
- seconds.

12. Calculate
- y'
- .

$$y = 4 \ln(x^2 e^x)$$

13. Differentiate.

$$K(x) = (3x^6 + 1)(x^{11} - 16x)$$

14. Differentiate.

$$y = \frac{\sin x}{3 + \cos x}$$

15. Find the equation of the tangent line to the given curve at the specified point.

$$y = 9xe^x, (0, 0)$$

16. Differentiate.

$$y = \frac{1}{x^5 + x^3 + 1}$$

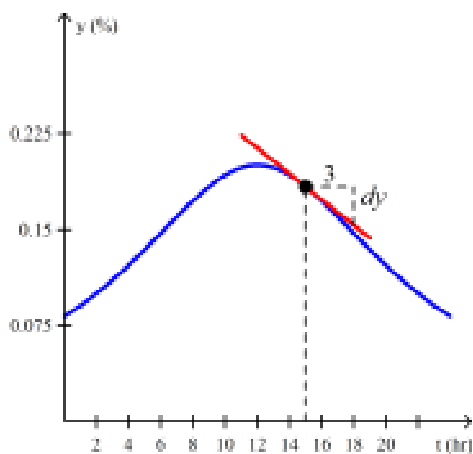
17. Calculate y' .

$$y = 5\sqrt{x} \cos \sqrt{x}$$

18. Find y''' , if $y = \sqrt{2x+7}$.

Short Answer

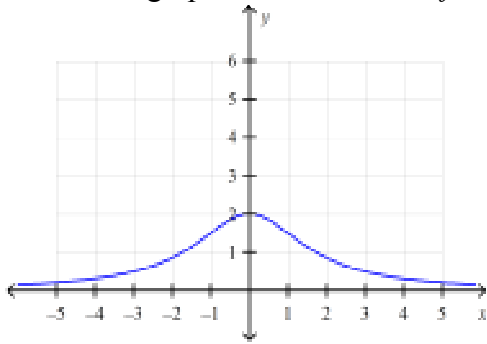
1. The graph shows the percentage of households in a certain city watching television during a 24-hr period on a weekday ($t = 0$ corresponds to 6 a.m.). By computing the slope of the respective tangent line, estimate the rate of change of the percentage of households watching television at a-12 p.m. Note that $dy = 0.03$



2. Find an equation of the tangent line to the graph of $f(x) = \frac{7}{x}$ at the point $\left(4, \frac{7}{4}\right)$.
3. Find the derivative of the function and evaluate $f'(x)$ at the given value of x .

$$f(x) = (\sqrt{x} + 4x)(x^{3/2} - x); \quad x = 4$$

4. Sketch the graph of the derivative f' of the function f whose graph is given.



5. Show that the function is continuous but not differentiable at the given value of x .

$$f(x) = \begin{cases} x - 7 & \text{if } x < 0 \\ x^2 - 7 & \text{if } x \geq 0 \end{cases}; \quad x = 0$$

6. Plot the graph of the function f in an appropriate viewing window.

$$f(x) = 5x^3 - 4x^2 + 5x + 24$$

7. Determine the constants A , B , and C such that the parabola $y = Ax^2 + Bx + C$ passes through the point $(-3, 8)$ and is tangent to the line $y = -\frac{1}{4}x - \frac{21}{4}$ at the point where $x = 2$.
8. Suppose that f and g are functions that are differentiable at $x = 1$ and that $f(1) = 1$, $f'(1) = -3$, $g(1) = 2$, and $g'(1) = 5$. Find $h'(1)$.

$$h(x) = \frac{xf(x)}{x + g(x)}$$

9. $s(t)$ is the position of a body moving along a coordinate line; $s(t)$ is measured in feet and t in seconds, where $t \geq 0$. Find the position, velocity, and speed of the body at the indicated time.

$$s(t) = \frac{3t}{t^2 + 1}; \quad t = 2$$

Name: _____

ID: A

10. The position function of a body moving along a coordinate line is

$$s(t) = 2 \sin t + 2 \cos t$$

where t is measured in seconds and $s(t)$ in feet. Find the position, velocity, speed, and acceleration of the body when $t = \frac{\pi}{2}$.

11. Find the derivative of the function.

$$f(x) = x \sin^8 x$$

MAC 2311 Chapter 2.1 - 2.5 Review Exercises/Practice for the Exam Answer Section

MULTIPLE CHOICE

- | | | | | |
|-----|-------------------|------------------------|------------------------------------|--------------|
| 1. | ANS: B
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.1 | REF: 2.1.28 |
| 2. | ANS: C
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.1 | REF: 2.1.20 |
| 3. | ANS: C
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.1 | REF: 2.1.4a |
| 4. | ANS: A
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.1 | REF: 2.1.5 |
| 5. | ANS: B
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.1 | REF: 2.1.42 |
| 6. | ANS: E
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.1 | REF: 2.1.45a |
| 7. | ANS: B
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.2 | REF: 2.2.51 |
| 8. | ANS: B
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Easy
NOT: Section 2.2 | REF: 2.2.3a |
| 9. | ANS: A
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.8 |
| 10. | ANS: D
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.68 |
| 11. | ANS: E
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.63 |
| 12. | ANS: C
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.17 |
| 13. | ANS: D
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.75 |
| 14. | ANS: D
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.29 |
| 15. | ANS: C
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Difficult
NOT: Section 2.3 | REF: 2.3.27 |
| 16. | ANS: B
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.67 |
| 17. | ANS: D
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.3 | REF: 2.3.10 |
| 18. | ANS: D
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Medium
NOT: Section 2.4 | REF: 2.4.42 |
| 19. | ANS: A
KEY: 7e | PTS: 1
MSC: Bimodal | DIF: Easy
NOT: Section 2.4 | REF: 2.4.1 |

20.	ANS: B KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 2.4	REF: 2.4.35a
21.	ANS: B KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: 2.5	REF: 2.5.7
22.	ANS: C KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 2.5	REF: 2.5.17
23.	ANS: C KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 3.4	REF: 3.4.72
24.	ANS: B KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 2.5	REF: 2.5.61
25.	ANS: A KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 2.5	REF: 2.5.50
26.	ANS: A KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 2.5	REF: 2.5.8
27.	ANS: A KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 2.5	REF: 2.5.31
28.	ANS: E KEY: 7e	PTS: 1 MSC: Bimodal	DIF: Medium NOT: Section 3.4	REF: 3.4.61

MULTIPLE RESPONSE

1.	ANS: B, D KEY: 7e	PTS: 1 MSC: Multiple Response	DIF: Medium	REF: 2.3.80 NOT: Section 2.3
2.	ANS: B, D KEY: 7e	PTS: 1 MSC: Multiple Response	DIF: Medium	REF: 2.5.48 NOT: Section 2.5

NUMERIC RESPONSE

1.	ANS: $10x - 4$	PTS: 1 MSC: Numerical Response	DIF: Medium NOT: Section 2.1	REF: 2.1.27	KEY: 7e
2.	ANS: $y = \frac{1}{200}(x - 4) + 0.6$	PTS: 1 MSC: Numerical Response	DIF: Medium NOT: 2.1	REF: 2.1.7	KEY: 7e
3.	ANS: $4(4 - x)^{-2}, -8(4 - x)^{-3}$	PTS: 1 MSC: Numerical Response	DIF: Medium NOT: Section 2.3	REF: 2.3.62	KEY: 7e

4. ANS: -5

PTS: 1 DIF: Medium REF: 2.3.70 KEY: 7e
 MSC: Numerical Response NOT: Section 2.3

5. ANS: $Y'(u) = 12u^2 + 8u - 1$

PTS: 1 DIF: Medium REF: 2.3.28 KEY: 7e
 MSC: Numerical Response NOT: Section 2.3

6. ANS: \$1,537,635,400

PTS: 1 DIF: Medium REF: 2.3.91 KEY: 7e
 MSC: Numerical Response NOT: Section 2.3

7. ANS: $Q = 3x^3 - 2x^2 + 2x + 5$

PTS: 1 DIF: Medium REF: 2.3.87 KEY: 7e
 MSC: Numerical Response NOT: Section 2.3

8. ANS: $g'(x) = 8x^7 \cos(x) - x^8 \sin(x)$

PTS: 1 DIF: Medium REF: 2.4.2 KEY: 7e
 MSC: Numerical Response NOT: Section 2.4

9. ANS: $\frac{dy}{dx} = \cos(x) + 2 \sin(x)$

PTS: 1 DIF: Medium REF: 2.4.14 KEY: 7e
 MSC: Numerical Response NOT: Section 2.4

10. ANS: 0

PTS: 1 DIF: Medium REF: 2.4.40 KEY: 7e
 MSC: Numerical Response NOT: Section 2.4

11. ANS: $\frac{12\pi}{7} \cos(12\pi t)$

PTS: 1 DIF: Medium REF: 2.5.75 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

12. ANS: $y' = 4 \left[\frac{2}{x} + 1 \right]$

PTS: 1 DIF: Medium REF: 3.4.23 KEY: 7e
 MSC: Numerical Response NOT: Section 3.4

13. ANS: $18x^5(x^{11} - 16x) + (3x^6 + 1)(11x^{10} - 16)$

PTS: 1 DIF: Medium REF: 2.5.18 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

14. ANS: $\frac{dy}{dx} = \frac{3 \cos x + 1}{(3 + \cos x)^2}$

PTS: 1 DIF: Medium REF: 2.5.10 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

15. ANS: $y = 9x$

PTS: 1 DIF: Medium REF: 2.5.51 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

16. ANS: $y' = \frac{-(5x^4 + 3x^2)}{(x^5 + x^3 + 1)^2}$

PTS: 1 DIF: Medium REF: 2.5.21 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

17. ANS: $y' = -\frac{5}{2} \left(\frac{\sqrt{x} \sin \sqrt{x} - \cos \sqrt{x}}{\sqrt{x}} \right)$

PTS: 1 DIF: Medium REF: 2.5.29 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

18. ANS: $3(2x + 7)^{-5/2}$

PTS: 1 DIF: Medium REF: 2.5.70 KEY: 7e
 MSC: Numerical Response NOT: Section 2.5

SHORT ANSWER

1. ANS:
 Falling at 1% / hr

PTS: 1 DIF: Easy REF: 2.1.42 KEY: 7e
 MSC: Short Answer NOT: Section 2.1

2. ANS:

$$y = -\frac{7}{16}x + \frac{7}{2}$$

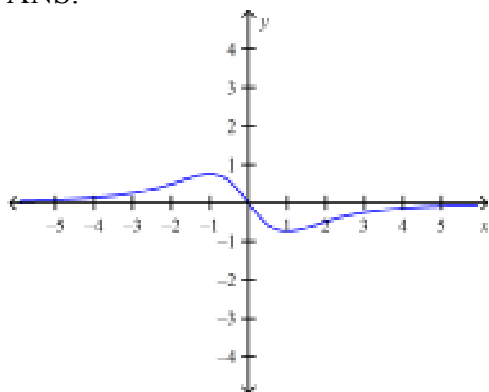
PTS: 1 DIF: Difficult REF: 2.1.8 KEY: 7e
 MSC: Short Answer NOT: Section 2.1

3. ANS:

53

PTS: 1 DIF: Medium REF: 2.1.23 KEY: 7e
 MSC: Short Answer NOT: Section 2.1

4. ANS:



PTS: 1 DIF: Medium REF: 2.2.6 KEY: 7e
 MSC: Short Answer NOT: Section 2.2

5. ANS:

$f(x)$ is continuous at 0 since both $\lim_{x \rightarrow 0^-} f(x) = \lim_{x \rightarrow 0^-} x - 7 = -7$ and $\lim_{x \rightarrow 0^+} f(x) = \lim_{x \rightarrow 0^+} x^2 - 7 = -7$ are equal to $f(0) = -7$.

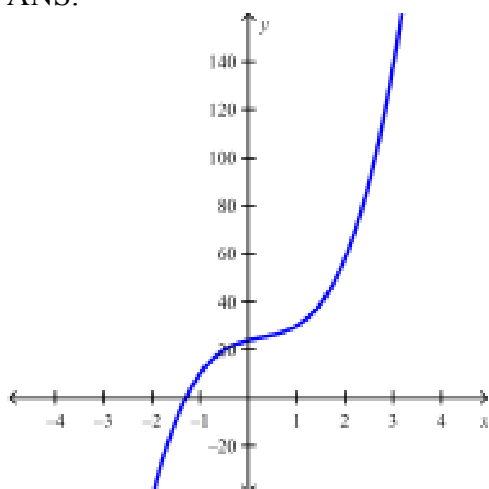
$f(x)$ is not differentiable at 0 since the left-hand limit of the quotient $\frac{f(0+h)-f(0)}{h}$ does not equal its right-hand limit as shown below.

$$\lim_{h \rightarrow 0^-} \frac{f(0+h)-f(0)}{h} = \lim_{h \rightarrow 0^-} \frac{f(h)-f(0)}{h} = \lim_{h \rightarrow 0^-} \frac{(h-7)-(-7)}{h} = \lim_{h \rightarrow 0^-} \frac{h}{h} = \lim_{h \rightarrow 0^-} 1 = 1 \quad (x < 0)$$

$$\lim_{h \rightarrow 0^+} \frac{f(0+h)-f(0)}{h} = \lim_{h \rightarrow 0^+} \frac{f(h)-f(0)}{h} = \lim_{h \rightarrow 0^+} \frac{(h^2-7)-(-7)}{h} = \lim_{h \rightarrow 0^+} \frac{h^2}{h} = \lim_{h \rightarrow 0^+} h = 0 \quad (x > 0)$$

PTS: 1 DIF: Medium REF: 2.2.54d KEY: 7e
 MSC: Short Answer NOT: Section 2.2

6. ANS:



PTS: 1 DIF: Easy REF: 2.3.49a KEY: 7e
 MSC: Short Answer NOT: Section 2.3

7. ANS:

$$A = \frac{1}{2}, B = -\frac{9}{4}, C = -\frac{13}{4}$$

PTS: 1 DIF: Difficult REF: 2.3.90 KEY: 7e
 MSC: Short Answer NOT: Section 2.3

8. ANS:

$$-\frac{4}{3}$$

PTS: 1 DIF: Difficult REF: 2.3.68d KEY: 7e
 MSC: Short Answer NOT: Section 2.3

9. ANS:

$$\frac{6}{5} \text{ ft}, -\frac{9}{25} \text{ ft/sec}, \frac{9}{25} \text{ ft/sec}$$

PTS: 1 DIF: Medium REF: 2.3.64 KEY: 7e
 MSC: Short Answer NOT: Section 2.3

10. ANS:

Position: 2 ft

Velocity: -2 ft/sec

Speed: 2 ft/sec

Acceleration: -2 ft/sec²

PTS: 1 DIF: Medium REF: 2.4.35b KEY: 7e
 MSC: Short Answer NOT: Section 2.4

11. ANS:

$$\sin^8 x + 8x \cos x \sin^7 x$$

PTS: 1 DIF: Medium REF: 2.5.14 KEY: 7e
MSC: Short Answer NOT: Section 2.5