Chapter 1_Form C

MULTIPLE CHOICE

1. A cardiac monitor is used to measure the heart rate of a patient after surgery. It compiles the number of heartbeats after t minutes. When the data in the table are graphed, the slope of the tangent line represents the heart rate in beats per minute. The monitor estimates this value by calculating the slope of a secant line. Use the data to estimate the patient's heart rate after 42 minutes using the secant line between the points with $t = 38$ and $t = 42$.

t (min)	36	38	40	42	44
Heartbeats	2,570	2,640	2,840	3,000	3,070

Select the correct answer.

a. -89
b. 180
c. 90
d. 100
e. 89
f. 95

ANS: C PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.4

2. If an arrow is shot upward on the moon with a velocity of 55 m/s, its height in meters after t seconds is given by $h = 55t - 0.04t^2$. Find the average velocity of the interval [1, 1.04].

Select the correct answer.

a. 54.9194 m/s
b. 55.0284 m/s
c. 54.8174 m/s
d. 54.9184 m/s
e. 54.9084 m/s

ANS: D PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.4

3. Find the domain.

$g(u) = \sqrt{u} - \sqrt{9-u}$

Select the correct answer.

a. $[0, \infty)$
b. $(-\infty, 0]$
c. $(0, 9)$
d. $[0, 9]$

e. $(-9, \infty]$

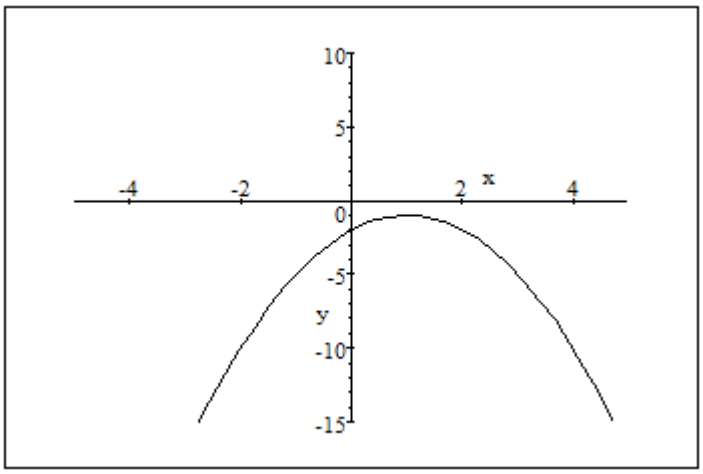
ANS: D PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.1

4. Graph the function by hand, not by plotting points, but by starting with the graph of one of the standard functions and then applying the appropriate transformations.

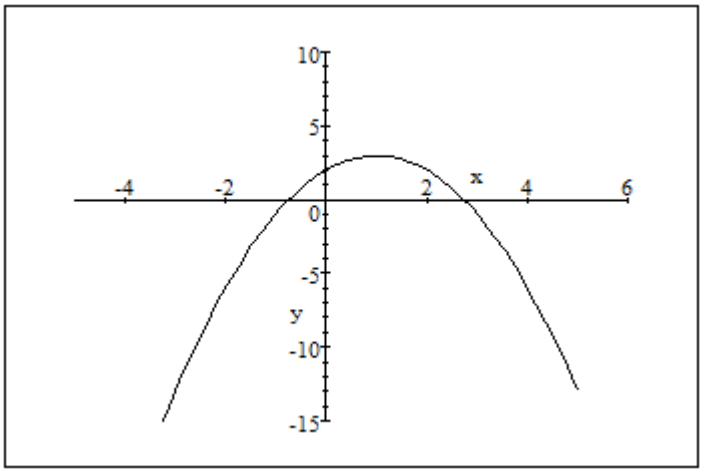
$y = 2 + 2x - x^2$

Select the correct answer.

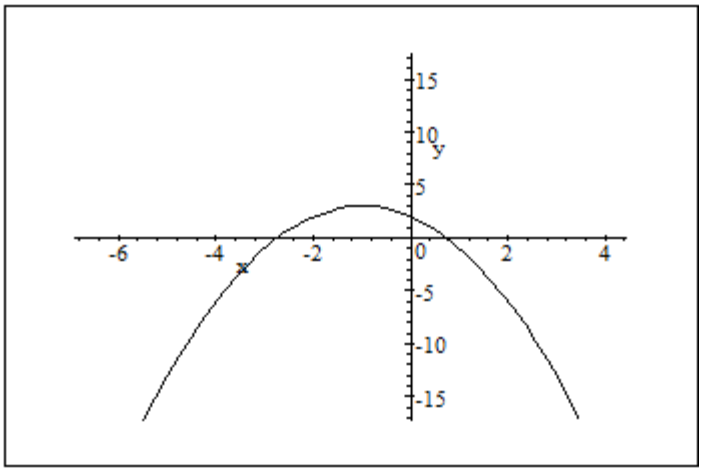
a.



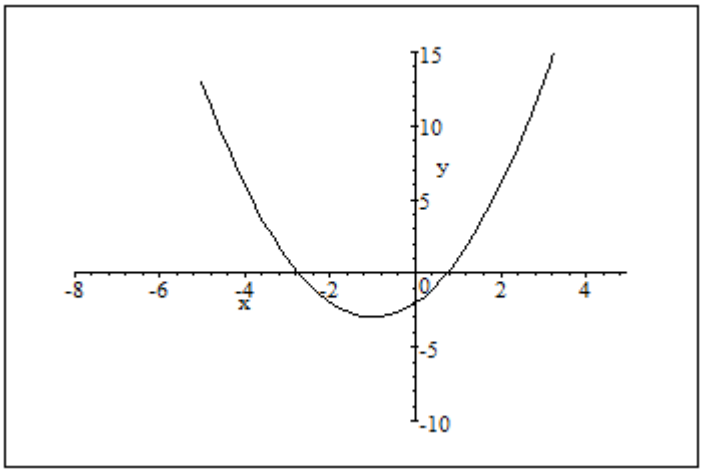
b.



c.



d.



ANS: B PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.3

5. Estimate the value of the limit by graphing the function $f(x) = \dfrac{2 \sin x}{\sin \pi x}$. State your answer correct to two decimal places.

$$\lim_{x \to 0} \frac{2 \sin x}{\sin \pi x}$$

Select the correct answer.

a. 3.14
b. 2.01
c. 1.0
d. 0
e. 0.64

ANS: E PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

6. Find the limit.

$$\lim_{x \to 2} \sqrt{\frac{2x^2 + 1}{3x - 2}}$$

Select the correct answer.

a. $-1 / 2$
b. $3 / 2$
c. $-3 / 2$
d. 0
e. does not exist

ANS: B PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

7. Evaluate the limit.

$$\lim_{x \to 1} (x + 2)^3 \left(x^2 - 6\right)$$

Select the correct answer.

a. 27
b. -45
c. -135
d. 29
e. -125

ANS: C PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

8. Many physical quantities are connected by *inverse square laws*, that is, by power functions of the form $f(x) = kx^{-2}$. In particular, the illumination of an object by a light source is inversely proportional to the square of the distance from the source. Suppose that after dark you are in a room with just one lamp and you are trying to read a book. The light is too dim and so you move two-thirds the distance to the lamp. How much brighter is the light?

Select the correct answer.

a. 9 times
b. 9/4 times
c. 4/9 times
d. 3/2 times
e. 9/2 times

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.2

9. Find the limit.

$$\lim_{x \to 2^-} \frac{x^2 - 2x}{x^2 - 4x + 4}$$

Select the correct answer.

a. $-\infty$
b. ∞
c. 2
d. -2
e. 0

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

10. How would you define $f(3)$ in order to make f continuous at 3?

$$f(x) = \frac{x^2 - x - 6}{x - 3}$$

Select the correct answer.

a. $f(3) = 5$
b. $f(3) = 0$
c. $f(3) = 1$
d. $f(3) = -5$
e. none of these

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.8

11. A machinist is required to manufacture a circular metal disk with area 1000 cm^2. If the machinist is allowed an error tolerance of $\pm 10\,\text{cm}^2$ in the area of the disk, how close to the ideal radius must the machinist control the radius? Round down the answer to the nearest hundred thousandth.

Select the correct answer.

a. $\delta \le 0.08898\,\text{cm}$
b. $\delta \le 0.08908\,\text{cm}$
c. $\delta \le 0.08999\,\text{cm}$
d. $\delta \le 0.08913\,\text{cm}$
e. $\delta \le 0.09913\,\text{cm}$

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.7

12. Use the graph of the function to state the value of $\lim_{x \to 0} f(x)$, if it exists.

$$f(x) = \frac{1}{1 + 2^{1/x}}$$

Select the correct answer.

a. 1/2
b. 0
c. 1/3

d. ∞
e. does not exist

ANS: E PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

13. Choose an equation from the following that expresses the fact that a function f is continuous at the number 6.

Select the correct answer.

a. $\lim_{x \to 0} f(x) = 6$
b. $\lim_{x \to 6} f(x) = f(6)$
c. $\lim_{x \to 0} f(x) = f(6)$
d. $\lim_{x \to 6} f(x) = -\infty$
e. $\lim_{x \to 6} f(x) = \infty$

ANS: B PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.8

14. Determine where f is discontinuous.

$$f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0 \\ 3 - x & \text{if } 0 \le x < 3 \\ (3-x)^2 & \text{if } x > 3 \end{cases}$$

Select the correct answer.

a. 0 *and* 3
b. 0 *only*
c. 3 *only*
d. 0 *and* -3
e. -3 *only*

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.8

15. Find a, such that the function $f(x) = 4x + \sqrt{a - x^2}$ has the domain $(-5, 5)$.

Select the correct answer.

a. $a = 5$
b. $a = 25$
c. $a = -25$
d. $a = \sqrt{5}$
e. $a = -\sqrt{5}$

ANS: B PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.1

16. Use the graph of the function to state the value of $\lim_{x \to 0} f(x)$, if it exist.

$$f(x) = \frac{x^2 + x}{3\sqrt{x^3 + x^2}}$$

Select the correct answer.

a. $-1/3$
b. ∞
c. $1/3$
d. $-\infty$
e. does not exist

ANS: E PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

17. Find the vertical asymptotes of the function.

$$y = \frac{2x^2 + 1}{3x - 2x^2}$$

Select the correct answer.

a. $x = 3$
b. $x = 2/3$
c. $x = 0,\ x = 2/3$
d. $x = -2/3$
e. none of these

ANS: E PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5

18. Which of the following graphs is neither even nor odd?

Select the correct answer.

a. $f(x) = 6x^3 + 8x^2 + 7$
b. $f(x) = \frac{2x^2}{x^4 + 1}$
c. $f(x) = x^3 - 5x$

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.1

19. If *f* and *g* are continuous functions with $f(5) = 5$ and $\lim_{x \to 5} \left[2f(x) - g(x) \right] = 6$, find $g(5)$.

Select the correct answer.

a. $g(5) = 4$
b. $g(5) = 5$
c. $g(5) = 16$
d. $g(5) = 2$
e. $g(5) = 6$

ANS: A PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.8

20. Find the limit.

$$\lim_{x \to 3} \frac{x^2 + 6x - 27}{x - 3}$$

Select the correct answer.

a. 15
b. 12
c. 16
d. 11
e. 10

ANS: B PTS: 1 DIF: Medium MSC: Multiple Choice
NOT: Section 1.5