

Test Bank for Single Variable Calculus 7th Edition by James Stewart

Chapter 1: Functions And Limits

MULTIPLE CHOICE

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

$$f(x) = \frac{1}{1 + 3^{1/x}}$$

Select the correct answer.

- a. ∞
- b. 0
- c. $-1/4$
- d. $-\infty$
- e. does not exist

ANS: E

PTS:
1

DIF: Medium

MSC: Multiple Choice

NOT: Section 1.5

2. Find the value of the limit.

$$\lim_{x \rightarrow 0} 3 \frac{\tan 5x - 5x}{x^3}$$

Select the correct answer.

- a. 121
- b. 135
- c. 134
- d. 130
- e. 125

ANS: E

PTS:
1

DIF: Medium

MSC: Multiple Choice

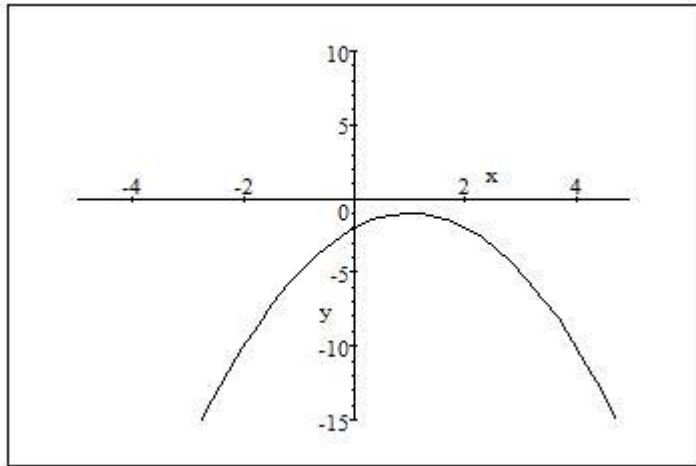
NOT: Section 1.5

3. 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.

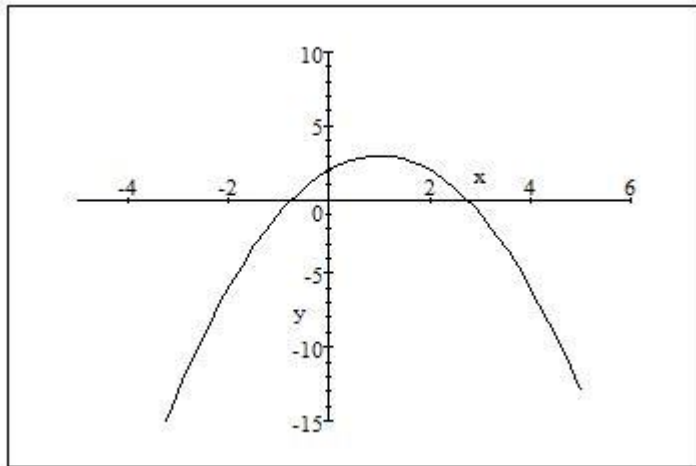
$$y = 2 + 2x - x^2$$

Select the correct answer.

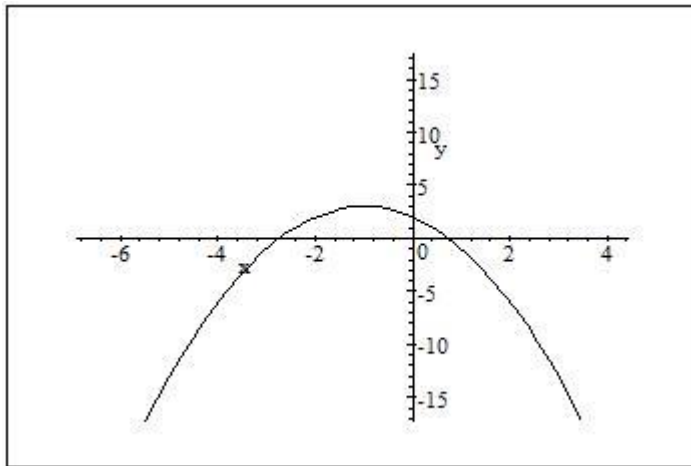
a.



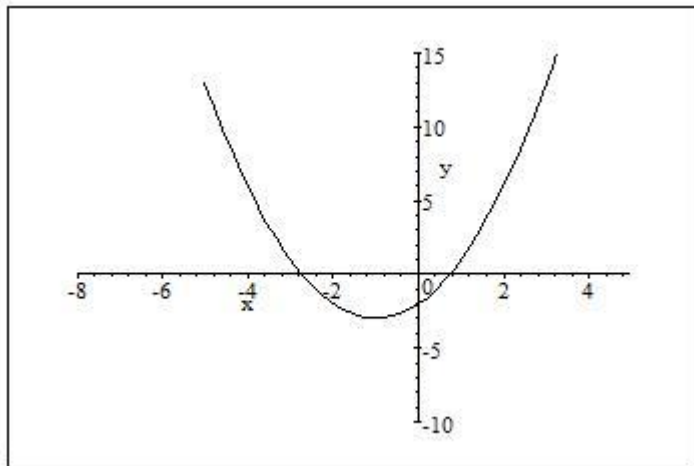
b.



c.



d.



ANS: B

PTS: 1

DIF: Medium

MSC: Multiple Choice

NOT: Section 1.3

4. Let

$$F(x) = \frac{x^2 - 81}{|x - 9|}.$$

Find the following limits.

$$\lim_{x \rightarrow 9^+} F(x), \quad \lim_{x \rightarrow 9^-} F(x)$$

Select the correct answer.

- a. 18 and 9
- b. 18 and -18
- c. both 18
- d. 18 and -9
- e. 81 and 9

PTS: 1

ANS: B

DIF: Medium

NOT: Section 1.6

5. If f and g are continuous functions with $f(5) = 2$ and $\lim_{x \rightarrow 5} [2f(x) - g(x)] = 5$, find $g(5)$.

Select the correct answer.

- a. $g(5) = 2$
- b. $g(5) = -1$
- c. $g(5) = 9$
- d. $g(5) = 3$
- e. $g(5) = 5$

ANS: B

PTS:

1

DIF: Medium

MSC: Multiple Choice

NOT: Section 1.8

6. Find the limit.

$$\lim_{x \rightarrow 3} \frac{x^2 + 3x - 18}{x - 3}$$

Select the correct answer.

- a. 6
- b. 8
- c. 5
- d. 9
- e. 18

ANS: D

PTS:

1

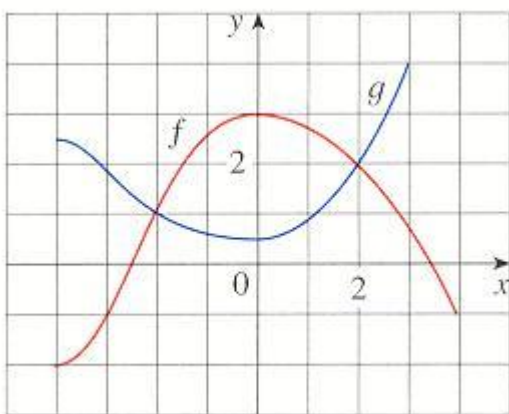
DIF: Medium

MSC: Multiple Choice

NOT: Section 1.5

NUMERIC RESPONSE

1. The graphs of $f(x)$ and $g(x)$ are given.
- a) For what values of x is $f(x) = g(x)$?
 - b) Find the values of $f(-4)$ and $g(3)$.



ANS:

- a) $x = -2, 2$
 b) $f(-4) = -2$.

PTS: 1 DIF: Medium MSC: Numerical Response
 NOT: Section 1.1

2. Consider the following function.

$$f(x) = \begin{cases} 1-x & x < -1 \\ x & -1 \leq x < 1 \\ (x-1)^2 & x \geq 1 \end{cases}$$

Determine the values of a for which $\lim_{x \rightarrow a} f(x)$ exists.

ANS:

PTS: 1 DIF: Medium MSC: Numerical Response
 NOT: Section 1.6

3. Find the vertical asymptotes of the function.

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

ANS: $x = 0, x = 3/2$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.5

4. If $f(x) = x^2 - 2x + 1$, evaluate the difference quotient $\frac{f(a+h) - f(a)}{h}$.

ANS: $2a + h - 2$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.1

5. Evaluate the limit.

$$\lim_{x \rightarrow 3} \left(\frac{x^3 - 5}{x^2 - 4} \right)$$

ANS: $22/5$

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.5

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

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

ANS: 0.64

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.5

7. 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 three-fourths the distance to the lamp. How much brighter is the light?

ANS: 16 times brighter

PTS: 1 DIF: Medium MSC: Numerical Response

NOT: Section 1.2

8. Use a graph to find a number δ such that $\left| \sqrt{4x+1} - 3 \right| < 0.5$ whenever $|x-2| < \delta$.

ANS:

PTS: 1 DIF: Medium MSC: Numerical Response

NOT: Section 1.7

9. How would you define $f(2)$ in order to make f continuous at 2?

$$f(x) = \frac{x^3 - 8}{x^2 - 4}$$

ANS:

PTS: 1 DIF: Medium MSC: Numerical Response

NOT: Section 1.8

10. Find the slope of the tangent line to the curve $y = 5x^3$ at the point $(-4, -320)$.

ANS: 240

PTS: 1 DIF: Medium MSC: Numerical Response

NOT: Section 1.4

11. Use the table to evaluate the expression $(f \circ g)(3)$.

x	1	2	3	4	5	6
$f(x)$	3	2	1	0	1	2
$g(x)$	6	5	2	3	4	6

ANS: 2

PTS: 1 DIF: Medium MSC: Numerical Response

NOT: Section 1.3

12. Evaluate the limit, if it exists.

$$\lim_{h \rightarrow 0} \frac{-(x-h)^3 + x^3}{h}$$

ANS:

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.6

13. By graphing the function $f(x) = \frac{2(\cos x - \cos 2x)}{x^2}$ and zooming in toward the point where the graph crosses the y-axis, estimate the value of $\lim_{x \rightarrow 0} f(x)$.
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ANS: 3

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.5

14. Use continuity to evaluate the limit.

$$\lim_{x \rightarrow -17\pi} \sin(x + 3 \sin x)$$

ANS: 0

PTS: 1 DIF: Medium MSC: Numerical Response
NOT: Section 1.8