Multivariable Calculus 7th Edition Stewart Test Bank

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Chapter 1_Form A

NUMERIC RESPONSE

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, g(3) = 4

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

2. The position of a car is given by the values in the following table.

t (seconds)	0	1	2	3	4	5
s (feet)	0	19	33	74	114	178

Estimate the instantaneous velocity when t = 2 by averaging the average velocities for the periods [1, 2] and [2, 3].

ANS: 27.5 ft/s

PTS: 1 DIF: Medium MSC: Numerical Response NOT: Section 1.4

3. If a rock is thrown upward on the planet Mars with a velocity of 10 m/s, its height in meters t seconds later is given by $10t - 1.86t^2$. Find the average velocity over the time interval [1, 2].

ANS: 4.42 m/s

PTS: 1 DIF: Medium MSC: Numerical Response NOT: Section 1.4

4. Suppose that the graph of f is given. Describe how the graph of the function y = f(x-3) - 3 can be obtained from the graph of f.

ANS: Shift the graph 3 units to the right and 3 units down.

PTS: 1 DIF: Medium MSC: Numerical Response NOT: Section 1.3

5. Find an equation of the tangent line to the curve $y = 5x^3$ at the point (-3, -135).

ANS: y = 135x + 270

PTS: 1 DIF: Medium MSC: Numerical Response NOT: Section 1.4

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

ANS: 2a + h - 1

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

7. Evaluate the limit.

$$\lim_{x \to 0} \frac{1 - \sqrt{1 - x^2}}{x}$$

ANS: 0

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

8. A spherical balloon with radius r inches has volume $4\pi r^3/3$. Find a function that represents the amount of air required to inflate the balloon from a radius of r inches to a radius of r+2 inches.

ANS:
$$\frac{8}{3}\pi\left(3r^2+6r+4\right)$$

PTS: 1 DIF: Medium NOT: Section 1.1

MSC: Numerical Response

9. Evaluate the limit.

$$\lim_{x \to 16} \frac{4 - \sqrt{x}}{x - 16}$$

ANS: -1/8

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

10. How close to 2 do we have to take x so that 5x + 3 is within a distance of 0.01 from 13?

ANS: |x - 2| < 0.002

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

11. 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

12. 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 halfway to the lamp. How much brighter is the light?

PTS: 1 DIF: Medium MSC: Numerical Response

ANS: The light is 4 times brighter.

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

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

ANS: 0.64

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

14. Evaluate the limit, if it exists.

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

ANS: $-3x^2$

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

15. If the point (7, 3) is on the graph of an even function, what other point must also be on the graph?

ANS: (-7, 3)

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

16. For x = 5, determine whether f is continuous from the right, from the left, or neither.



ANS: neither

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

17. Find the point at which the given function is discontinuous.

$$f(x) = \begin{cases} \frac{1}{x-4} &, x \neq 4 \\ 4 &, x = 4 \end{cases}$$

ANS: 4

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

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

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

ANS: 1

PTS:	1	DIF:	Medium	MSC:	Numerical Response
NOT:	Section 1.3				

19. Use continuity to evaluate the limit.

$$\lim_{x \to 9} \frac{16 + \sqrt{x}}{\sqrt{16 + x}}$$

ANS:
$$\frac{19}{5}$$

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

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

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

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ANS: f(3) = 4

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