Student Solutions Manual for Stewart's Single Variable Calculus: Early Transcendentals, 8ED.

(James Stewart) |Calculus|

2021

Stewart - Calculus 8e Chapter 1 Form A

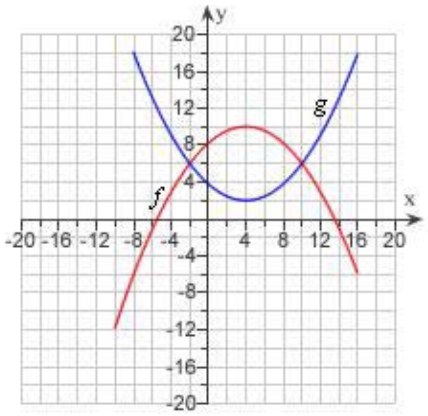
1. Find the domain of the function.

$$f(x) = \frac{5}{4x - 1}$$

2. Determine whether f is even, odd, or neither.

$$f(x) = \frac{8x^2}{x^4 + 1}$$

3. 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 $f(-2)$ and $g(4)$.



4. It makes sense that the larger the area of a region, the larger the number of species that inhabit the region. Many ecologists have modeled the species-area relation with a power function and, in particular, the number of species *S* of bats living in caves in central Mexico has been related to the surface area *A* measured in m^2 of the caves by the equation

$$S = 0.7A^{03}$$

   (a) The cave called mission impossible near puebla, mexico, has suface area of $A = 90\,\mathrm{m}^2$. How many species of bats would expect to find in that cave?

   (b) If you discover that 5 species of bats live in cave estimate the area of the cave.

5. Express the function in the form of $f \circ g$.

$$v(t) = \sec\left(t^4\right)\tan\left(t^4\right)$$

6. 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	16	35	71	112	179

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

7. Consider the following function.

$$f(x) = \begin{cases} 3 - x & x < -1 \\ x & -1 \le x < 3 \\ (x-3)^2 & x \ge 3 \end{cases}$$

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

8. Find the limit.

$$\lim_{x \to 0^+} \tan^{-1}\left(\frac{2}{x}\right)$$

9. Evaluate the limit.

$$\lim_{x \to 0} \frac{(6+x)^{-1} - 6^{-1}}{x}$$

10. Find the limit.

$$\lim_{x \to \frac{10}{x}} \tan^{-1}\left(\frac{5}{x}\right)$$

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11. Evaluate the limit.

$$\lim_{x \to 3} \left(\frac{x^3 - 5}{x^2 - 6} \right)$$

12. Evaluate the limit.

$$\lim_{x \to 9} \frac{3 - \sqrt{x}}{x - 9}$$

13. Evaluate the limit.

$$\lim_{x \to 0} \frac{3 - \sqrt{3 - x^2}}{x}$$

14. Find a number δ such that if $|x - 2| < \delta$, then $|4x - 8| < \varepsilon$, where $\varepsilon = 0.1$.

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

$$f(x) = \begin{cases} \dfrac{1}{x - 7}, & x \neq 7 \\ 7, & x = 7 \end{cases}$$

16. Write an equation that expresses the fact that a function f is continuous at the number 4.

17. Find a function *g* that agrees with f for $x \neq 25$ and is continuous on $\Re$.

$$f(x) = \frac{5 - \sqrt{x}}{25 - x}$$

18. Let $f(x) = x^2 - 18x + 75$ and $g(x) = \sqrt{x + 7}$. Find $(f \circ g)(74)(g \circ g)(74)$.

19. Find the limit $\lim_{x \to 0^+} \dfrac{9 + \sqrt{x}}{\sqrt{x + 16}}$.

20. Find the numbers, if any, where the function $f(x) = \dfrac{x - 3}{x^2 - 9}$ is discontinuous.

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Answer Key

1. $\left\{ x \middle| x \neq \frac{1}{4} \right\}$

2. even

3. a) –2, 10
   b) $f(-2) = 6,\ g(4) = 2$

4. a) 3 species
   b) $702\,\text{m}^2$

5. $f(t) = \sec(t)\tan(t)$
   $g(t) = t^4$

6. 27.5 ft/s

7. $(-\infty,\ -1) \cup (-1,\ 3) \cup (3,\ \infty)$

8. $\frac{\pi}{2}$

9. $-\frac{1}{36}$

10. 0

11. $\frac{22}{3}$

12. $-1/6$

13. ∞

14. $\delta = 0.025$

15. 7

16. $\lim_{x \to 4} f(x) = f(4)$

17. $g(x) = \dfrac{1}{5 + \sqrt{x}}$

18. –6

19. $\dfrac{9}{4}$

20. ± 3

Stewart - Calculus 8e Chapter 1 Form B

1. Find the domain of the function.

   $f(x) = \sqrt{49 - x^2}$

2. A spherical balloon with radius r inches has volume $\frac{4}{3}\pi r^3$.
   Find a function that represents the amount of air required to inflate the balloon from a radius of r inches to a radius of $r+1$ inches.

3. It makes sense that the larger the area of a region, the larger the number of species that inhabit the region. Many ecologists have modeled the species-area relation with a power function and, in particular, the number of species *S* of bats living in caves in central Mexico has been related to the surface area *A* measured in m^2 of the caves by the equation

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   How many species of bats would expect to find in that cave?

   (b) If you discover that 5 species of bats live in cave estimate the area of the cave.

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

5. A stone is dropped into a lake, creating a circular ripple that travels outward at a speed of 45 cm/s. Express the radius *r* of this circle as a function of the time *t* (in seconds) and find $A \circ r$, if *A* is the area of this circle as a function of the radius.

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