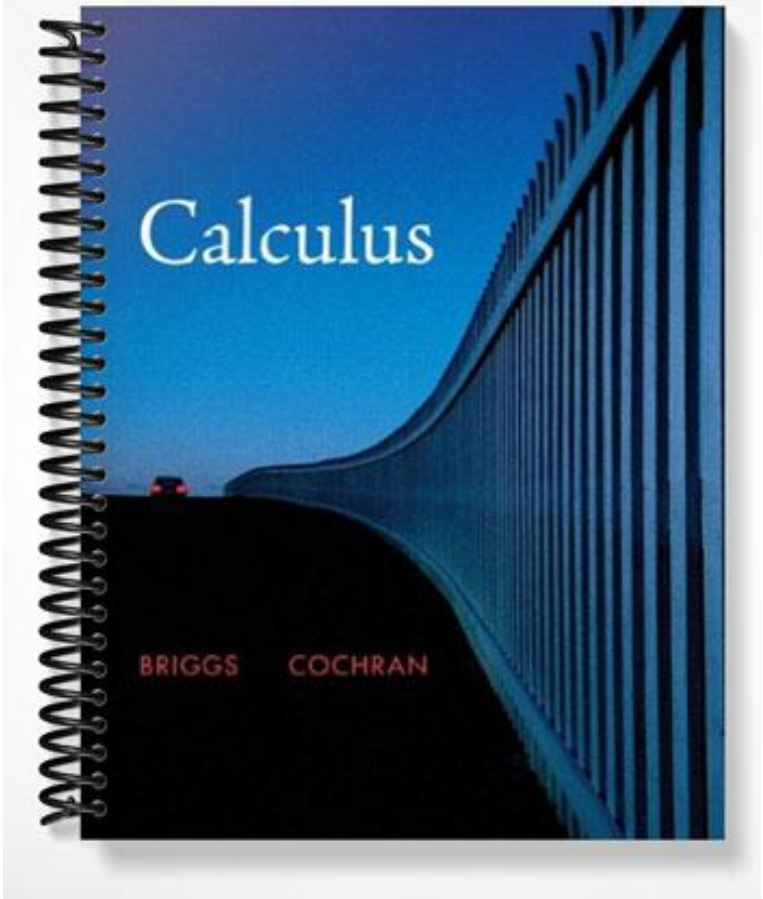
SOLUTIONS MANUAL



Chapter 2 Answer Section

Quick Quiz 2.1 Answers:

1a **2**c **3**b **4**a **5**a **6**a

Quick Quiz 2.2 Answers:

1b **2**a **3**c **4**c **5**c **6**b **7**c **8**a **9**c **10**b

Quick Quiz 2.3 Answers:

1c **2**c **3**c **4**b **5**c **6**b **7**b **8**a **9**c **10**b

Quick Quiz 2.4 Answers:

1a **2**a **3**c **4**a **5**c **6**c **7**a **8**a

Quick Quiz 2.5 Answers:

1b **2**a **3**c **4**c **5**b **6**a **7**b **8**c **9**c **10**b

Quick Quiz 2.6 Answers:

1b **2**a **3**c **4**c **5**c **6**c **7**a **8**b **9**c **10**c

Quick Quiz 2.7 Answers:

1b **2**c **3**b **4**c **5**c **6**a **7**c

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Chapter 2 Review Question Answers

1. The value of the function tends to L as x tends to a.

2. Let f be a function defined on an open interval containing a; f need not be defined at the point a. The limit $\lim_{x\to a} f(x) = L$ means that for all $\varepsilon > 0$ there exists a $\delta > 0$ such that if $|x-a| < \delta$, then $|f(x) - L| < \varepsilon$.

3. Any positive value of δ will satisfy this condition provided that it is less than $\frac{1}{4}$.

4. They must exist and be equal.

5. The function $\sqrt{x-1}$ is defined only when $x \geq 1$, which occurs only in the right-hand limit.

6. This is because the limit asks how the function behaves as x gets near 1, not when $x = 1$.

7. No; the left- and right-hand limits of $\frac{x-1}{x^2-4x+3}$ as x approaches 1 do not approach $\pm\infty$ (a requirement for a vertical asymptote), whereas the limits associated with $x = 3$ do approach $\pm\infty$.

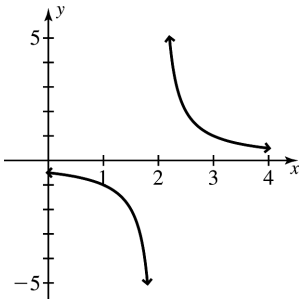
8. The vertical asymptotes are given by the roots of q that are not also roots of p.

9. Evaluate p at $x = a$.

10. Continuity from the left means $\lim_{x\to a^-} f(x) = f(a)$. Continuity from the right means $\lim_{x\to a^+} f(x) = f(a)$.

11. We can make $f(x)$ as large as we wish by making x sufficiently close to a.

12. No, if $f(x)$ were continuous on $[1,3]$ then $f(x)$ would attain every value between -1 and 1.



13. As x goes to a, $g(x)$ gets closer to 0 from the negative side.

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Chapter 2 Test Bank Answers

1. 50 **2.** 90 **3.** -2 **4.** -3

5. $2a$ **6.** $-2a$ **7.** $2a$ **8.** $\frac{1}{2}$

9. $-\frac{1}{25}$ **10.** $-\frac{1}{20}$ **11.** -8

12. a. 10 b. 10 c. 10

13. a. 4 b. 4 c. 4

14. -2 **15.** $\frac{1}{4}$ **16.** $\frac{1}{2}$

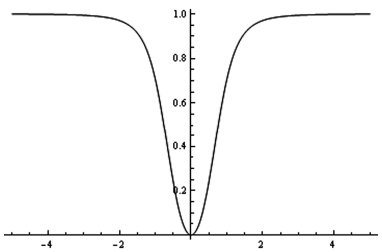
17. $\lim_{V\to 0^+}\sqrt[3]{\frac{3V}{4\pi}} = 0$; This result means that as the volume of a sphere gets arbitrarily small, then the radius of the same sphere also approaches zero.

18. ∞ **19.** -3 **20.** $\lim_{x\to\infty} f(x) = \lim_{x\to-\infty} f(x) = 0$ **;** horizontal asymptote at $y = 0$

21. $\lim_{x\to\infty} f(x) = 2$ and $\lim_{x\to-\infty} f(x) = -2$; horizontal asymptotes at $y = \pm 2$

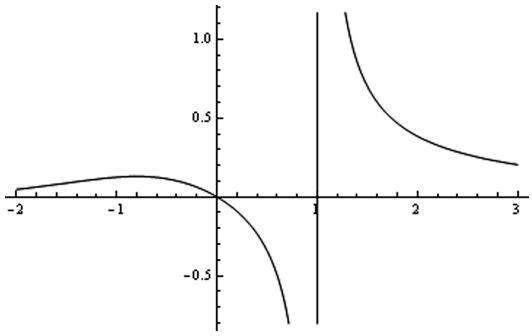
22. a. no vertical asymptotes, horizontal asymptote at $y = 1$

b.



23. a. vertical asymptote at $x = 1$, horizontal asymptote at $y = 0$

b. The hand-drawn sketch should show the vertical asymptote at $x = 1$ as a dashed line (rather than the solid line shown in the figure).



24. continuous

25. continuous

26. $a = 5$

27. a. $a = 4$, $b = 1$

b. $a = 4$, $b \neq 1$

c. $a \neq 4$, $b = 1$

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