at the end of the textbook chapter 2 (e-book): (suggested test review)

1a, c, d, h

Chapter 2 Review Exercises

1. Explain why or why not Determine whether the following statements are true and give an explanation or counterexample.

a. The rational function $\frac{x-1}{x^2-1}$ has vertical asymptotes at $x = -1$ and $x = 1$.

c. The value of $\lim_{x \to a} f(x)$, if it exists, is found by calculating $f(a)$.

d. If $\lim_{x \to a} f(x) = \infty$ or $\lim_{x \to a} f(x) = -\infty$, then $\lim_{x \to a} f(x)$ does not exist.

h. If $\lim_{x \to a} f(x)$ can be calculated by direct substitution, then f is continuous at $x = a$.

4,

4. Estimating limits graphically Use the graph of *f* in the figure to evaluate the function or analyze the limit.

a. $f(-1)$

b. $\lim_{x \to -1^-} f(x)$

c. $\lim_{x \to -1^+} f(x)$

d. $\lim_{x \to -1} f(x)$

e. $f(1)$

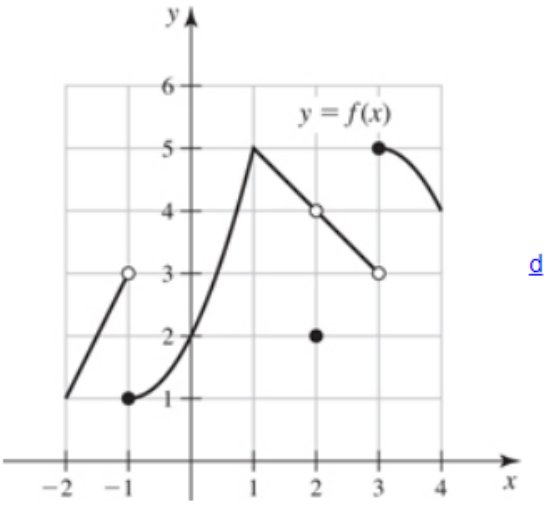
f. $\lim_{x \to 1} f(x)$

g. $\lim_{x \to 2} f(x)$

h. $\lim_{x \to 3^-} f(x)$

i. $\lim_{x \to 3^+} f(x)$

j. $\lim_{x \to 3} f(x)$



d

10, 11, 15, 16, 17, 18, 27 (graph needed),

10–51. Calculating limits *Determine the following limits.*

10. $\lim_{x \to 1000} 18\pi^2$

11. $\lim_{x \to 1} \sqrt{5x+6}$

12. $\lim_{h \to 0} \frac{\sqrt{5x+5h} - \sqrt{5x}}{h}$, where $x > 0$ is constant

13. $\lim_{h \to 0} \frac{(3x+3h)^2 + (3x+3h) - 42}{h}$

14. $\lim_{x \to a} \frac{(3x+1)^2 - (3a+1)^2}{x-a}$, where a is constant

15. $\lim_{x \to 1} \frac{x^3 - 7x^2 + 12x}{4-x}$

16. $\lim_{x \to 4} \frac{x^3 - 7x^2 + 12x}{4-x}$

17. $\lim_{x \to 1} \frac{1-x^2}{x^2 - 8x + 7}$

18. $\lim_{x \to 3} \frac{\sqrt{3x+16} - 5}{x-3}$

19. $\lim_{x \to 2} \frac{1}{x-2}\left(\frac{1}{x+1} - \frac{1}{3}\right)$

27. $\lim_{x \to 5} \frac{x-7}{x(x-5)^2}$

28. $\lim_{x \to -5^+} \frac{x-5}{x+5}$

(use graph or sign chart),

40, 42, 45, 50,

40. $\lim_{z\to\infty}(e^{-2z}+\frac{2}{z})$

41. $\lim_{x}(3\tan^{-1}x+\ldots)$

42. $\lim_{x\to-\infty}(-3x^3+5)$

43. $\lim_{x\to-\infty}(|x-1|+x)$ and $\lim_{x\to\infty}(|x-1|+x)$

44. $\lim_{x\to-\infty}\frac{(|x-2|+x)}{x}$ and $\lim_{x\to\infty}\frac{(|x-2|+x)}{x}$

45. $\lim_{w\to\infty}\frac{\ln w^2}{\ln w^3+1}$

46. $\lim_{r\to-\infty}\frac{1}{2+e^r}$ and $\lim_{r\to\infty}\frac{1}{2+e^r}$

47. $\lim_{r\to\infty}\frac{2e^{4r}+3e^{5r}}{\ldots}$ and $\lim\frac{2e^{4r}+3e^{5r}}{\ldots}$

48. $\lim_{x\to-\infty}e^x\sin x$

49. $\lim_{x\to\infty}\left(5+\frac{\cos^4}{x^2+x+1}\right)$

50. $\lim_{t\to\infty}\frac{\cos t}{e^{3t}}$

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71-74,

71–74. Continuity at a point *Use the continuity checklist to determine whether the following functions are continuous at the given value of a.*

71. $f(x) = \frac{1}{x-5}; a = 5$

72. $g(x) = \begin{cases} \frac{x^2-16}{x-4} & \text{if } x \neq 4 \\ 9 & \text{if } x = 4 \end{cases}; a = 4$

73. $h(x) = \begin{cases} -2x + 14 & \text{if } x \leq 5 \\ \sqrt{x^2 - 9} & \text{if } x > 5 \end{cases}; a = 5$

74. $g(x) = \begin{cases} \frac{x^3-5x^2+6x}{x-2} & \text{if } x \neq 2 \\ -2 & \text{if } x = 2 \end{cases}; a = 2$

79,

79. Determining unknown constants Let

$$g(x) = \begin{cases} 5x - 2 & \text{if } x < 1 \\ a & \text{if } x = 1 \\ ax^2 + bx & \text{if } x > 1. \end{cases}$$

Determine values of the constants *a* and *b*, if possible, for which *g* is continuous at $x = 1$.

82, 83

T 82–83. Intermediate Value Theorem

a. *Use the Intermediate Value Theorem to show that the equation has a solution in the given interval.*

b. *Estimate a solution to the equation in the given interval using a root finder.*

T 82. $x^5 + 7x + 5 = 0; (-1, 0)$

T 83. $x = \cos x; \left(0, \frac{\pi}{2}\right)$