

Unit 1 Day 2 HW(3)

In Exercises 21–32, evaluate each function at the given values of the independent variable and simplify.

21. $f(x) = 4x + 5$
 a. $f(6)$ b. $f(x + 1)$ c. $f(-x)$
22. $f(x) = 3x + 7$
 a. $f(4)$ b. $f(x + 1)$ c. $f(-x)$
23. $g(x) = x^2 + 2x + 3$
 a. $g(-1)$ b. $g(x + 5)$ c. $g(-x)$
24. $g(x) = x^2 - 10x - 3$
 a. $g(-1)$ b. $g(x + 2)$ c. $g(-x)$
25. $h(x) = x^4 - x^2 + 1$
 a. $h(2)$ b. $h(-1)$
 c. $h(-x)$ d. $h(3a)$
26. $h(x) = x^3 - x + 1$
 a. $h(3)$ b. $h(-2)$
 c. $h(-x)$ d. $h(3a)$
27. $f(r) = \sqrt{r + 6} + 3$
 a. $f(-6)$ b. $f(10)$ c. $f(x - 6)$
28. $f(r) = \sqrt{25 - r} - 6$
 a. $f(16)$ b. $f(-24)$ c. $f(25 - 2x)$
29. $f(x) = \frac{4x^2 - 1}{x^2}$
 a. $f(2)$ b. $f(-2)$ c. $f(-x)$

30. $f(x) = \frac{4x^3 + 1}{x^3}$
 a. $f(2)$ b. $f(-2)$ c. $f(-x)$
31. $f(x) = \frac{x}{|x|}$
 a. $f(6)$ b. $f(-6)$ c. $f(r^2)$
32. $f(x) = \frac{|x + 3|}{x + 3}$
 a. $f(5)$ b. $f(-5)$ c. $f(-9 - x)$

In Exercises 33–44, find and simplify the difference quotient

$$\frac{f(x + h) - f(x)}{h}, \quad h \neq 0$$

for the given function.

33. $f(x) = 4x$ 34. $f(x) = 7x$
35. $f(x) = 3x + 7$ 36. $f(x) = 6x + 1$
37. $f(x) = x^2$ 38. $f(x) = 2x^2$
39. $f(x) = x^2 - 4x + 3$ 40. $f(x) = x^2 - 5x + 8$
41. $f(x) = 6$ 42. $f(x) = 7$
43. $f(x) = \frac{1}{x}$ 44. $f(x) = \frac{1}{2x}$

In Exercises 45–50, evaluate each piecewise function at the given values of the independent variable.

45. $f(x) = \begin{cases} 3x + 5 & \text{if } x < 0 \\ 4x + 7 & \text{if } x \geq 0 \end{cases}$
 a. $f(-2)$ b. $f(0)$ c. $f(3)$
46. $f(x) = \begin{cases} 6x - 1 & \text{if } x < 0 \\ 7x + 3 & \text{if } x \geq 0 \end{cases}$
 a. $f(-3)$ b. $f(0)$ c. $f(4)$
47. $g(x) = \begin{cases} x + 3 & \text{if } x \geq -3 \\ -(x + 3) & \text{if } x < -3 \end{cases}$
 a. $g(0)$ b. $g(-6)$ c. $g(-3)$
48. $g(x) = \begin{cases} x + 5 & \text{if } x \geq -5 \\ -(x + 5) & \text{if } x < -5 \end{cases}$
 a. $g(0)$ b. $g(-6)$ c. $g(-5)$
49. $h(x) = \begin{cases} \frac{x^2 - 9}{x - 3} & \text{if } x \neq 3 \\ 6 & \text{if } x = 3 \end{cases}$
 a. $h(5)$ b. $h(0)$ c. $h(3)$
50. $h(x) = \begin{cases} \frac{x^2 - 25}{x - 5} & \text{if } x \neq 5 \\ 10 & \text{if } x = 5 \end{cases}$
 a. $h(7)$ b. $h(0)$ c. $h(5)$

In Exercises 51–74, find the domain of each function.

51. $f(x) = 4x^2 - 3x + 1$
53. $g(x) = \frac{3}{x - 4}$
55. $h(x) = \frac{7x}{x^2 - 16}$
57. $f(x) = \frac{2}{(x + 3)(x - 7)}$
59. $H(r) = \frac{4}{r^2 + 11r + 24}$
61. $f(t) = \frac{3}{t^2 + 4}$
63. $f(x) = \sqrt{x - 3}$
65. $f(x) = \frac{1}{\sqrt{x - 3}}$
67. $g(x) = \sqrt{5x + 35}$
69. $f(x) = \sqrt{24 - 2x}$
71. $f(x) = \sqrt{x^2 - 5x - 14}$
73. $f(x) = \frac{\sqrt{x - 2}}{x - 5}$