CHAPTER 5 REVIEW EXERCISES

Section 5.1

Sketch the graphs of the following functions by first identifying the more basic functions that have been shifted, reflected, stretched, or compressed. Then determine the domain and range of each function.

1. $f(x)=(x-1)^3+2$

2. $G(x)=4|x+3|$

3. $m(x)=\dfrac{1}{(x+2)^2}$

4. $g(x)=-\sqrt[3]{x}+4$

5. $r(x)=\dfrac{1}{x-2}-3$

6. $f(x)=\sqrt{x-1}+3$

7. $g(x)=\sqrt{\dfrac{x}{2}}+1$

8. $f(x)=-\sqrt{-4x}$

Write a formula for each of the functions described below.

9. Use the function $g(x)=x^2$. Move the function 1 unit to the right and 2 units down.

10. Use the function $g(x)=|x|$. Move the functions 3 units to the right and reflect across the x-axis.

11. Use the function $g(x)=\sqrt{x}$. Reflect the function across the x-axis and move it 4 units up.

Section 5.2

Determine if each of the following relations is a function. If so, determine whether it is even, odd, or neither. Also determine if it has y-axis symmetry, x-axis symmetry, origin symmetry, or none of the above.

12. $y=|2x-1|$

13. $y=\dfrac{1}{x^2}+1$

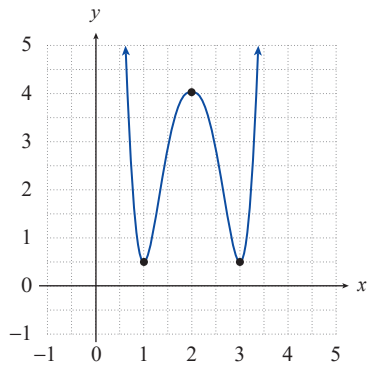
14. $x=-5|y|$

For each of the following functions, find the open intervals of monotonicity where the function is increasing, decreasing, or constant.

15. $f(x)=(x-2)^4-6$

16. $R(x)=\begin{cases}(x+2)^2 & \text{if } x<-1\\ -x & \text{if } x\geq -1\end{cases}$

17. Given the following graph of a function determine, **a.** the locations and types of the local extrema, and **b.** the values of the local extrema.



For each given function and interval, determine the average rate of change of the function over the interval.

18. $f(x)=x^2;\ [3,4]$

19. $f(x)=\frac{1}{x};\ [1,3]$

20. $f(x)=\sqrt{x};\ [1,4]$

21. $f(x)=x^2-x^3;\ [-1,2]$

Section 5.3

In each of the following exercises, use the information given to determine **a.** $(f+g)(2)$, **b.** $(f-g)(2)$, **c.** $(fg)(2)$, and **d.** $\left(\frac{f}{g}\right)(2)$.

22. $f(x)=-x^2+x$ and $g(x)=\frac{1}{x}$

23. $f(2)=4$ and $g(2)=-1$

24. $f(x)=\sqrt{2x}$ and $g(x)=x+3$

25. $f=\{(0,4),(2,8)\}$ and $g=\{(-2,2),(0,3),(2,-10)\}$

In each of the following exercises, find **a.** the formula and domain for $f+g$ and **b.** the formula and domain for $\frac{f}{g}$.

26. $f(x)=x^2$ and $g(x)=\sqrt{x}$

27. $f(x)=\frac{1}{x-2}$ and $g(x)=\sqrt[3]{x}$

28. $f(x)=3x$ and $g(x)=(x-1)^2$

29. $f(x)=x^2-4$ and $g(x)=\sqrt[3]{x}-1$

In each of the following exercises, use the information given to determine $(f\circ g)(3)$.

30. $f(x)=-x+1$ and $g(x)=-x-1$

31. $f(x)=\frac{x^{-1}}{18}-3$ and $g(x)=\frac{x-4}{x^3}$

32. $f(-3)=4$ and $g(3)=-3$

33. $f(x)=\frac{x}{3}$ and $g(x)=-\sqrt{x+1}$

In each of the following exercises, find **a.** the formula and domain for $f\circ g$ and **b.** the formula and domain for $g\circ f$.

34. $f(x)=4x-1$ and $g(x)=x^3+2$

35. $f(x)=\frac{1}{\sqrt{x-4}}$ and $g(x)=x+2$

36. $f(x)=2x^2+1$ and $g(x)=x-4$

37. $f(x)=3x$ and $g(x)=\sqrt{x-3}$

Write each of the following functions as a composition of two functions. Answers may vary.

38. $f(x)=\frac{3}{3x^2+1}$

39. $f(x)=\frac{\sqrt{x+2}}{x^2+4x+4}$

In each of the following exercises, use the information given to find $g(x)$.

40. $f(x)=6x-1$ and $(f\circ g)(x)=x+3$

41. $f(x)=\sqrt{x}+3$ and $(g\circ f)(x)=\frac{2}{\sqrt{x}+3}+1$

Section 5.4

Graph the inverse of each of the following relations, and state its domain and range.

42. $R=\{(3,4),(-1,5),(0,2),(-6,-1)\}$

43. $y=3x+1$

44. $y=\frac{\sqrt{x}}{2}$

Find a formula for the inverse of each of the following functions.

45. $r(x)=\dfrac{2}{7x-1}$ **46.** $g(x)=\dfrac{4x-3}{x}$ **47.** $f(x)=x^{\frac{1}{5}}-6$

48. $p(x)=2\sqrt{x-1}+3$ **49.** $f(x)=\dfrac{2x-3}{x+1}$ **50.** $f(x)=\sqrt[3]{x+2}-1$

51. $f(x)=8x+3$ **52.** $f(x)=(x-1)^2-3,\ x\geq 1$

Verify that $f\left(f^{-1}(x)\right)=x$ and that $f^{-1}\left(f(x)\right)=x$.

53. $f(x)=\dfrac{6x-7}{2-x}$ and $f^{-1}(x)=\dfrac{2x+7}{6+x}$