4.(a) $f(x) = x$ and $h(x) = x^3$ are one-to-one, $g(x) = x^2$ is not.

5.(a) Domain: $(-\infty, 4) \cup (4, \infty)$, Range: $(-\infty, -2) \cup (-2, \infty)$.
5.(b) Domain: $\{3, 5, 8, 10\}$, Range: $\{1, 3, -9\}$

7. $-(1/3)(x-1)^2 + 4$

9.(b) Increasing and concave up on $(-\infty, 1)$, increasing and concave down on $(1, \infty)$. $f(x) \to -1/2$ as $x \to \infty$ and $f(x) \to -1/2$ as $x \to -\infty$.

10. $f(g(x)) = \sqrt{x^2+3}+2$ has a domain of $(-\infty, \infty)$, $g(f(x)) = (\sqrt{x}+2)^2+3$ has a domain of $[0, \infty)$.
15. $-2\sqrt{(}-x+2)+3$

16. $-3|x-2|-1$

17.(a) yes, $f^{-1}(x) = \frac{x+2}{6}$
(b) no
(c) yes, $h^{-1}(x) = \sqrt[3]{\frac{x+2}{6}}$

21. 3

31. The behavior of $g(x)$ as $x \to \pm\infty$ matches that of its leading term $-6x^9$. Therefore $g(x) \to \infty$ as $x \to -\infty$ and $g(x) \to -\infty$ as $x \to \infty$.

33. $\frac{1}{4}(x-5)(x+3)$.

35. 10000 square feet (when the four outer edges of the rectangle are all 100 feet).

38. $(-\infty, -1) \cup (-1, 5) \cup (5, \infty)$.

42. $a = 2, b = 2, c = -1, d = 3, m = 2$.

43. $f(t) = 1000(1 + 0.06)^t$

47. $f(t) = 1200\left(\left(\frac{1700}{1200}\right)^{1/5}\right)^t$ = number of deer in Forest Park t years after 2015.

49. $f(x) = -2(3)^x + 4$.