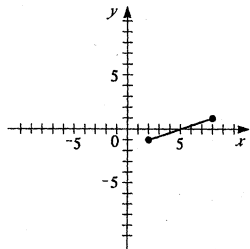


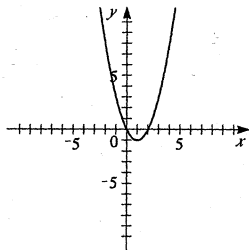
2. $f(x) = 1 + \sqrt{x-1}$; $f(5) = 1 + \sqrt{5-1} = 3$; $f(9) = 1 + \sqrt{9-1} = 1 + \sqrt{8} = 1 + 2\sqrt{2}$;
 $f(a+1) = 1 + \sqrt{a+1-1} = 1 + \sqrt{a}$; $f(-x) = 1 + \sqrt{-x-1}$; $f(x^2) = 1 + \sqrt{x^2-1}$.
 $[f(x)]^2 = \left(1 + \sqrt{x-1}\right)^2 = 1 + 2\sqrt{x-1} + x - 1 = x + 2\sqrt{x-1}$.

4. By the Vertical Line Test, figures (b) and (c) are graphs of functions. By the Horizontal Line Test, figure (c) is the graph of a one-to-one function.

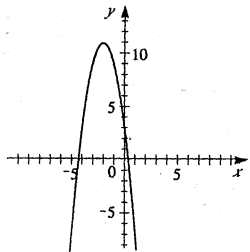
16. $f(x) = \frac{1}{3}(x - 5), 2 \leq x \leq 8$



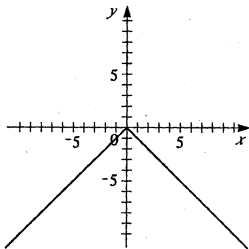
18. $g(t) = t^2 - 2t = (t - 1)^2 - 1$



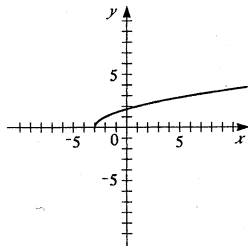
20. $f(x) = 3 - 8x - 2x^2 = -2(x - 2)^2 + 11$



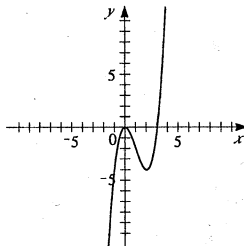
22. $y = -|x|$



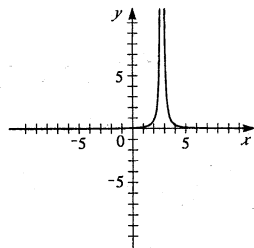
24. $y = \sqrt{x+3}$



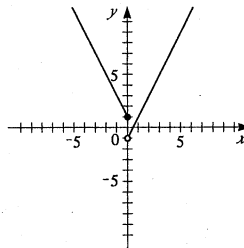
26. $H(x) = x^3 - 3x^2 = x^2(x-3)$



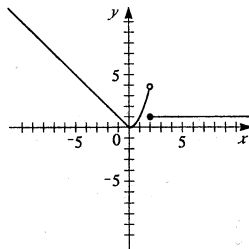
28. $G(x) = \frac{1}{(x-3)^2}$



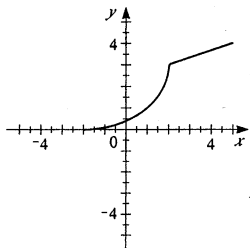
30. $f(x) = \begin{cases} 1-2x & \text{if } x \leq 0 \\ 2x-1 & \text{if } x > 0 \end{cases}$



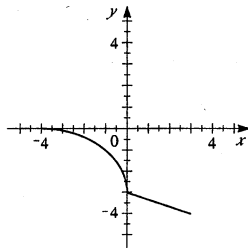
32. $f(x) = \begin{cases} -x & \text{if } x < 0 \\ x^2 & \text{if } 0 \leq x < 2 \\ 1 & \text{if } x \geq 2 \end{cases}$



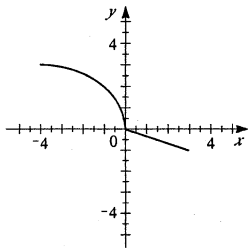
54. (a) $y = f(x - 2)$



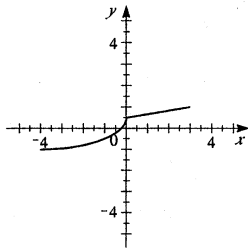
(b) $y = -f(x)$



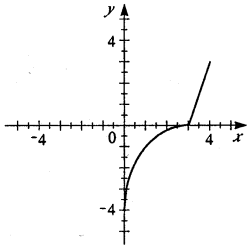
(c) $y = 3 - f(x)$



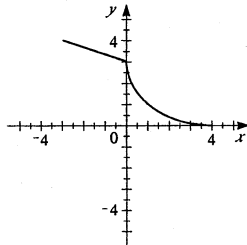
(d) $y = \frac{1}{2}f(x) - 1$



(e) $y = f^{-1}(x)$



(f) $y = f(-x)$



66. $f(x) = 1 + x^2$ and $g(x) = \sqrt{x - 1}$. (Remember that the proper domains must apply.)

(a) $(f \circ g)(x) = f(\sqrt{x - 1}) = 1 + (\sqrt{x - 1})^2 = 1 + x - 1 = x$

(b) $(g \circ f)(x) = g(1 + x^2) = \sqrt{(1 + x^2) - 1} = \sqrt{x^2} = |x|$

(c) $(f \circ g)(2) = f(g(2)) = f(\sqrt{(2) - 1}) = f(1) = 1 + (1)^2 = 2.$

(d) $(f \circ f)(2) = f(f(2)) = f(1 + (2)^2) = f(5) = 1 + (5)^2 = 26.$

(e) $(f \circ g \circ f)(x) = f((g \circ f)(x)) = f(|x|) = 1 + (|x|)^2 = 1 + x^2.$ (Note $(g \circ f)(x) = |x|$ by part (b).)

(f) $(g \circ f \circ g)(x) = g((f \circ g)(x)) = g(x) = \sqrt{x - 1}.$ (Note $(f \circ g)(x) = x$ by part (a).)

70. If $h(x) = \sqrt{x}$ and $g(x) = 1 + x$, then $(g \circ h)(x) = g(\sqrt{x}) = 1 + \sqrt{x}$. If $f(x) = \frac{1}{\sqrt{x}}$, then

$$(f \circ g \circ h)(x) = f(1 + \sqrt{x}) = \frac{1}{\sqrt{1 + \sqrt{x}}} = T(x).$$

$$78. \quad f(x) = \frac{2x+1}{3}, \quad y = \frac{2x+1}{3} \Leftrightarrow 2x+1 = 3y \Leftrightarrow 2x = 3y-1 \Leftrightarrow x = \frac{1}{2}(3y-1). \text{ So}$$
$$f^{-1}(x) = \frac{1}{2}(3x-1).$$

$$80. \quad f(x) = 1 + \sqrt[5]{x-2}, \quad y = 1 + \sqrt[5]{x-2} \Leftrightarrow y-1 = \sqrt[5]{x-2} \Leftrightarrow x-2 = (y-1)^5 \Leftrightarrow$$
$$x = 2 + (y-1)^5. \text{ So } f^{-1}(x) = 2 + (x-1)^5.$$