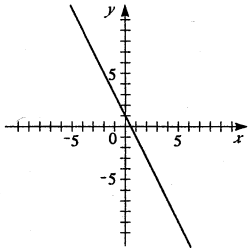
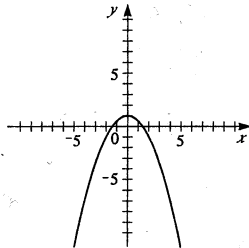


1.  $f(x) = x^2 - x + 1$ ;  $f(0) = (0)^2 - (0) + 1 = 1$ ;  $f(2) = (2)^2 - (2) + 1 = 3$ ;  
 $f(-2) = (-2)^2 - (-2) + 1 = 7$ ;  $f(a) = (a)^2 - (a) + 1 = a^2 - a + 1$ ;  
 $f(-a) = (-a)^2 - (-a) + 1 = a^2 + a + 1$ ;  
 $f(x+1) = (x+1)^2 - (x+1) + 1 = x^2 + 2x + 1 - x - 1 + 1 = x^2 + x + 1$ ;  
 $f(2x) = (2x)^2 - (2x) + 1 = 4x^2 - 2x + 1$ ;  
 $2f(x) - 2 = 2(x^2 - x + 1) - 2 = 2x^2 - 2x + 2 - 2 = 2x^2 - 2x$ .
3. (a)  $f(-2) = -1$ .  $f(2) = 2$ .
- (b) The domain of  $f$  is  $[-4, 5]$ .
- (c) The range of  $f$  is  $[-4, 4]$ .
- (d)  $f$  is increasing on  $[-4, -2]$  and  $[-1, 4]$ ;  $f$  is decreasing on  $[-2, -1]$  and  $[4, 5]$ .
- (e)  $f$  is not a one-to-one, for example,  $f(-2) = -1 = f(0)$ . There are many more examples.

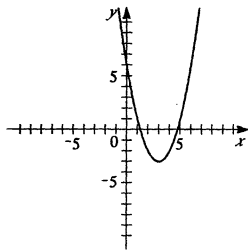
15.  $f(x) = 1 - 2x$



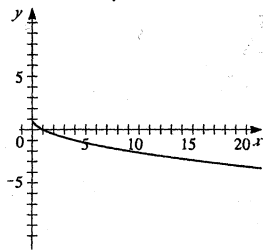
17.  $f(t) = 1 - \frac{1}{2}t^2$



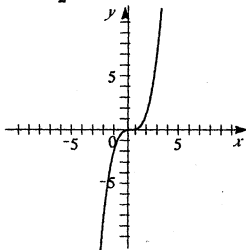
19.  $f(x) = x^2 - 6x + 6$



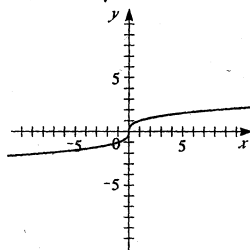
21.  $y = 1 - \sqrt{x}$



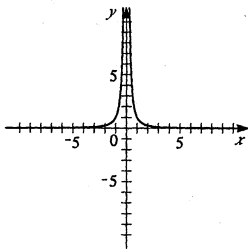
23.  $y = \frac{1}{2}x^3$



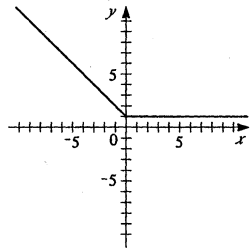
25.  $h(x) = \sqrt[3]{x}$



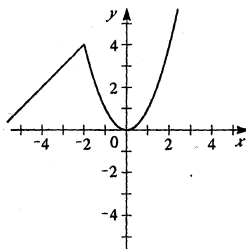
27.  $g(x) = \frac{1}{x^2}$



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



31.  $f_4(x) = \begin{cases} x + 6 & \text{if } x < -2 \\ x^2 & \text{if } x \geq -2 \end{cases}$

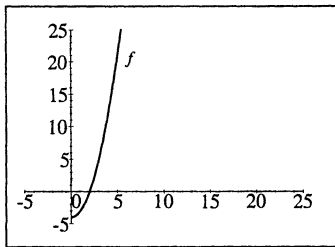


77.  $f(x) = 3x - 2 \Leftrightarrow y = 3x - 2 \Leftrightarrow 3x = y + 2 \Leftrightarrow x = \frac{1}{3}(y + 2)$ . So  
 $f^{-1}(x) = \frac{1}{3}(x + 2)$ .

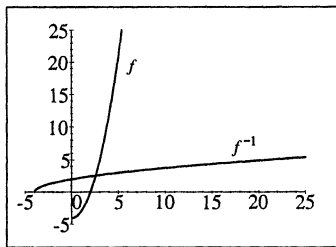
79.  $f(x) = (x + 1)^3 \Leftrightarrow y = (x + 1)^3 \Leftrightarrow x + 1 = \sqrt[3]{y} \Leftrightarrow x = -1 + \sqrt[3]{y}$ . So  
 $f^{-1}(x) = -1 + \sqrt[3]{x}$ .

81.  $f(x) = x^2 - 4, x \geq 0$ .

(a)



(b)



(c)  $f(x) = x^2 - 4, x \geq 0 \Leftrightarrow y = x^2 - 4, y \geq -4 \Leftrightarrow x^2 = y + 4 \Leftrightarrow x = \sqrt{y + 4}$ .  
 So  $f^{-1}(x) = \sqrt{x + 4}, x \geq -4$ .