

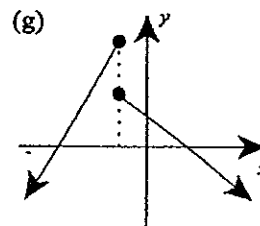
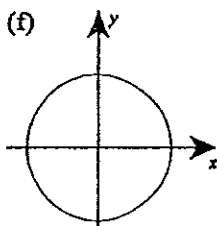
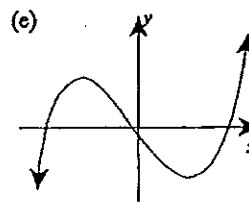
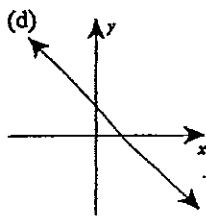
1. For each of the functions below, state whether or not it has an inverse function.

(Hint: Apply the horizontal line test).

(a)  $\{(1, 1), (2, 2), (3, 3)\}$

(b)  $\{(1, 2), (2, 3), (1, 4)\}$

(c)  $\{(3, 2), (4, 3), (5, 3)\}$



(h)  $y = 2x^2$

(i)  $x = y^2$

(j)  $y = 2$

(k)  $x = 1$

2. Find the inverse function of each of the following functions:

(a) $y = x + 1$	(b) $y = 3x - 2$	(c) $y = \frac{x + 2}{3}$
(d) $y = x^3$	(e) $y = (x + 1)^3$	(f) $y = \frac{1}{x - 1}$
(g) $y = \frac{x}{x - 1}$		

3. The function  $y = x$  is invariant under inversion.

That is, the equation of the function and its inverse are the same.

(i) Give examples of 2 more functions which are invariant under inversion.

(ii) What do you notice about the graphs of such functions?

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4. (a) Sketch the graph of  $y = \sqrt{3 - x}$ .

(b) On the same axes, sketch the graph of its inverse function.

(c) Find the equation of the inverse function.

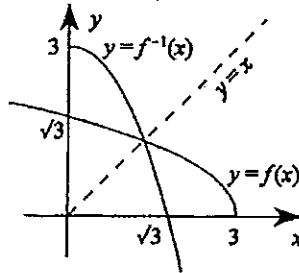
(d) Find the coordinates of the point of intersection of the function and its inverse.

**ANSWERS:**

1. (a) Yes (b) Not Function (c) No (d) Yes  
 (e) No (f) Not Function (g) Not Function (h) No  
 (i) Not Function (j) No (k) Not Function
2. (a)  $y = x - 1$  (b)  $y = \frac{x + 2}{3}$  (c)  $y = 3x - 2$  (d)  $y = \sqrt[3]{x}$   
 (e)  $y = \sqrt[3]{x} - 1$  (f)  $y = 1 + \frac{1}{x}$  (g)  $y = \frac{x}{x - 1}$
3. (i)  $y = -x$  (or more generally,  $y = c - x$ , where  $c$  is any constant);  $y = \frac{1}{x}$  (or  $y = \frac{c}{x}$ );

$y = \sqrt{c^2 - x^2}$  over the domain  $0 \leq x \leq c$ ; and an infinite number of others.

- (ii) They are all symmetrical in the line  $y = x$ .
4. (a), (b)



- (c)  $y = 3 - x^2, x \geq 0$   
 (d)  $\left( \frac{\sqrt{13} - 1}{2}, \frac{\sqrt{13} - 1}{2} \right)$