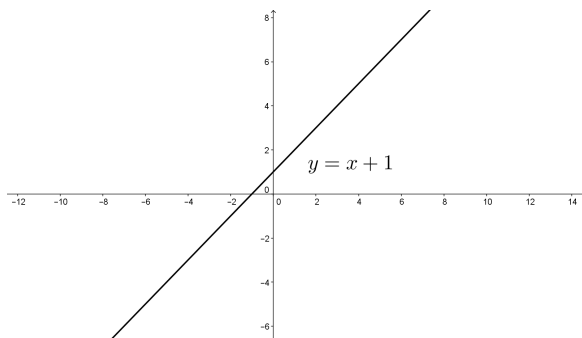
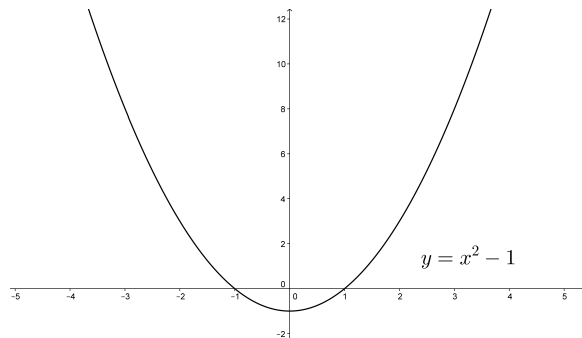


**2.1 Introduction**

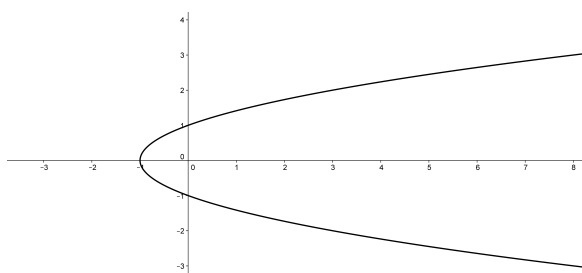
1. Which of the following relations are functions?



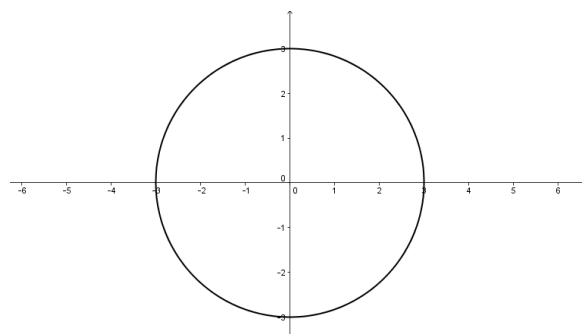
(a)



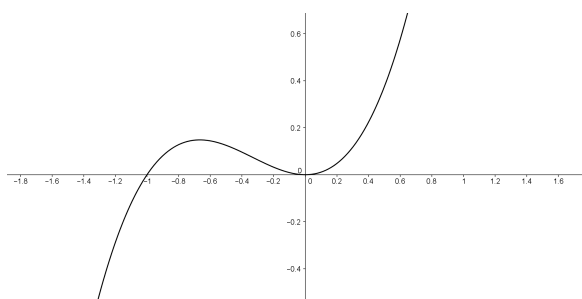
(b)



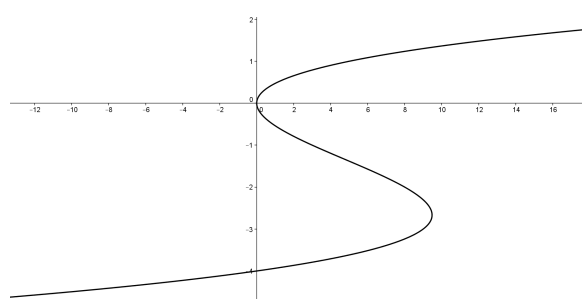
(c)



(d)

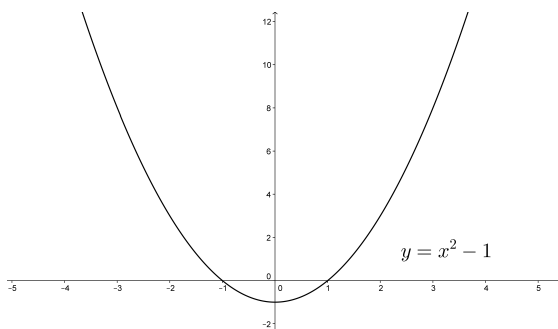


(e)

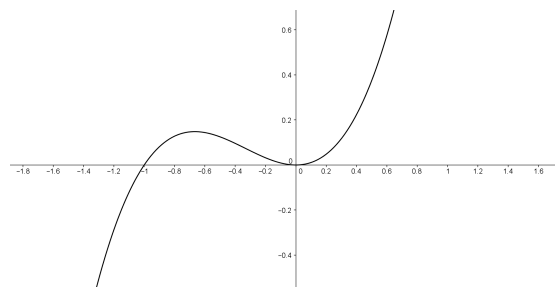


(f)

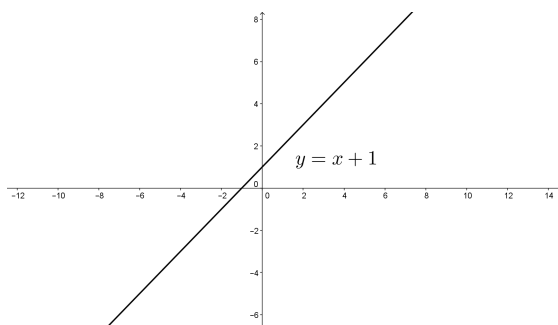
2. State whether the following functions injective, surjective, bijective or neither.



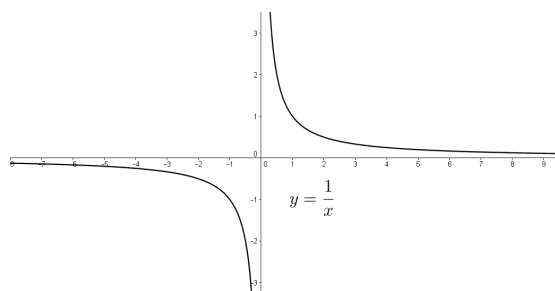
(a)



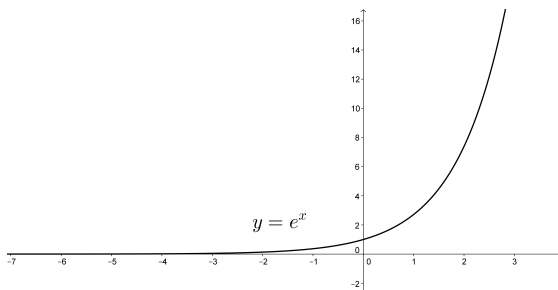
(b)



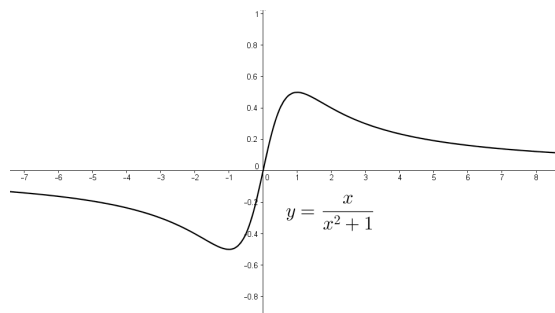
(c)



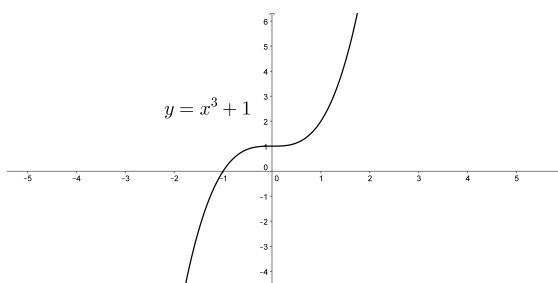
(d)



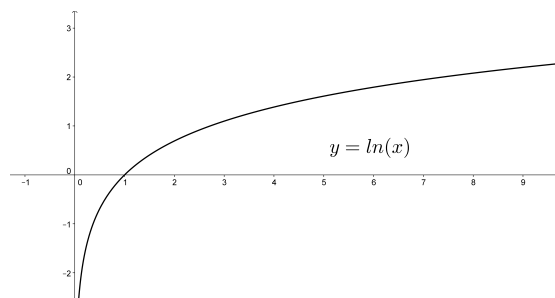
(e)



(f)



(g)



(h)

## 2.2 Composition of Functions

1.  $f : x \rightarrow 2x - 1$  and  $g : x \rightarrow 3 - 5x$  are two functions.

Find

- i.  $f(4)$
- ii.  $gf(4)$
- iii.  $fg(-1)$
- iv.  $gf(x)$ .

For what value of  $x$  is  $fg(x) = 25$ ?

2. If  $f(x) = x^2 - 1$  and  $g(x) = 3x + 2$ , find the value of each of the following:

- i.  $f(2)$
- ii.  $gf(2)$
- iii.  $g(4)$
- iv.  $fg(4)$
- v.  $f^2(3)$
- vi.  $g^2(3)$
- vii.  $gf(-5)$
- viii.  $fg(\frac{2}{3})$

3. If  $f(x) = 4x - 3$ , find

- i.  $f^2x$
- ii.  $f^3x$
- iii.  $f^4x$ .

Hence, find an expression for  $f^n(x)$  in terms of  $n$ .

## 2.3 Inverse Functions

1. Find the inverse of each of the following functions.

- i.  $f(x) = 2x$
- ii.  $g(x) = x + 4$
- iii.  $h(x) = 2x - 1$
- iv.  $k(x) = 3x + 5$
- v.  $f(x) = 2 - 3x$
- vi.  $g(x) = \frac{4}{x}, x \neq 0$
- vii.  $h(x) = \frac{1}{x-2}, x \neq 2$
- viii.  $k(x) = \frac{x-5}{x}, x \neq 0$
- ix.  $g(x) = \frac{2x}{3x-2}, x \neq \frac{2}{3}$
- x.  $f(x) = 1 + \frac{1}{x}, x \neq 0$

2. Find the inverse function of each of the following by completing the square:
- $f(x) = x^2 + 6x - 10, x \geq -3$
  - $f(x) = x^2 - 4x - 5, x \geq 2$
  - $f(x) = x^2 - 10x + 13, x \geq 5$
  - $f(x) = x^2 + 8x + 8, x \geq -4$
3. Given  $f(x) = \frac{4-x}{3}, -1 \leq x \leq 4$ .  
Sketch the graph of the given function and on the same set of axes, sketch the graph of the inverse function.  
State the domain and range of the inverse function.
4. Let  $f : A \rightarrow R, f(x) = \sqrt{2-x}$ .  
If  $A$  is the set of all real values of  $x$  for which  $f(x)$  is defined, find  $A$ .