

## Representing Functions & Relations

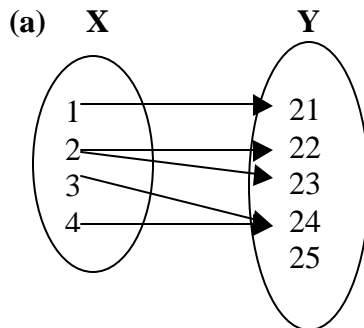
1. Consider the following correspondences (relations) between sets X and Y.

$$X = \{1, 2, 3, 4\}, Y = \{21, 22, 23, 24, 25\}$$

Which represent functions?

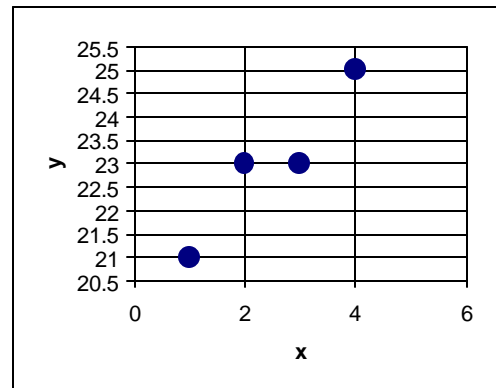
Of those which represent functions, which are onto Y?

Of those which represent functions, which are 1-1?



(b)

x	y
1	25
2	22
3	23
4	21



2. Classify each correspondence as a function or not a function. Those that are functions classify also as onto  $\mathbb{R}^+$ , not onto  $\mathbb{R}^+$ , 1-1, or not 1-1. In each case suppose the domain is  $\mathbb{R}$ . Also, suppose values associated with elements in the domain are in  $\mathbb{R}$ .

(a)  $g(x) = 2x + 3$

(b)  $h(x) = x^2 + 2$

(c)  $j(x) = 1/(x^2 + 1)$

(d)  $k(x) = y$  such that  $y > x$ .

(e)  $s(x) = \sin(x)$