

## Problem

Let  $X = \{1, 2, 3, 4\}$  and  $Y = \{a, b, c, d, e\}$ . Define  $g: X \rightarrow Y$  as follows:  $g(1) = a$ ,  $g(2) = a$ ,  $g(3) = a$ , and  $g(4) = d$ .

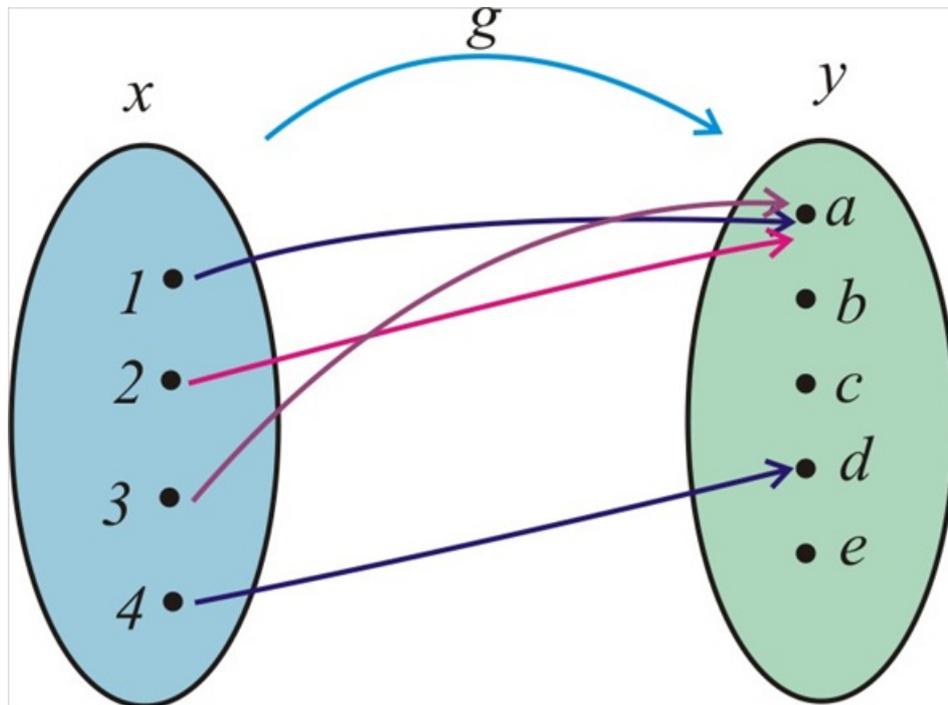
a. Draw an arrow diagram for  $g$ .

b. Let  $A = \{2, 3\}$ ,  $C = \{a\}$ , and  $D = \{b, c\}$ . Find  $g(A)$ ,  $g(X)$ ,  $g^{-1}(C)$ ,  $g^{-1}(D)$ , and  $g^{-1}(Y)$ .

## Step-by-step solution

## Step 1 of 3

(a) Arrow diagram for  $g$  is



## Step 2 of 3

(b)  $g(A) = \{a\}$  [Since  $A = \{2, 3\}$ ]  
 $g(X) = \{a, d\}$  [Since  $A = \{1, 2, 3, 4\}$ ]  
 $g^{-1}(C) = g^{-1}\{a\}$   
 $= \{1, 2, 3\}$

## Step 3 of 3

$g^{-1}(D) = g^{-1}\{b, c\}$   
 $= \phi$  [Since  $b$  and  $c$  not image of any element of  $X$ ]  
 $g^{-1}(Y) = \{1, 2, 3, 4\}$   
 $= X$