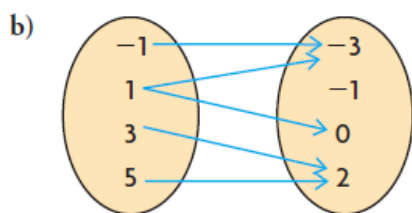


# Solutions

1. State which relations are functions. Explain.

a)  $\{(-5, 1), (-3, 2), (-1, 3), (1, 2)\}$

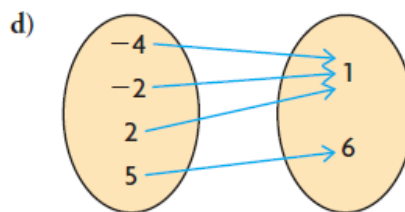
Function — each  $x$  value has only one  $y$ -value.



Relation —  $x = 1$  gives a  $y$ -value of  $-3$  or  $-1$ .

c)  $\{(0, 4), (3, 5), (5, -2), (0, 1)\}$

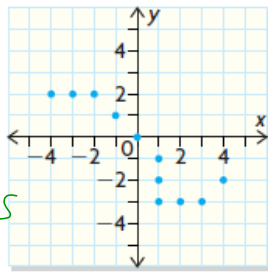
Relation —  $x = 0$  gives a  $y$ -value of  $4$  or  $1$ .



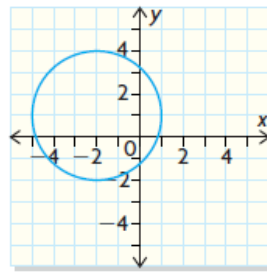
Function — each  $x$  value has only one  $y$ -value.

2. Use a ruler and the vertical-line test to determine which graphs are functions.

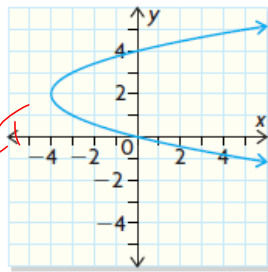
Not a function  
x=1 has 3 y-values



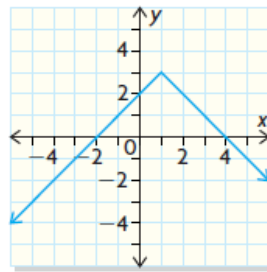
Not a function.  
Fails the VLT



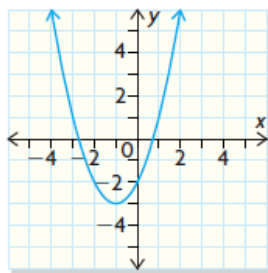
Not a function.  
Fails the VLT



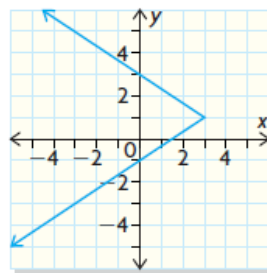
Function.  
Passes the VLT



Function.  
Passes the VLT



Not a function.  
Fails the VLT



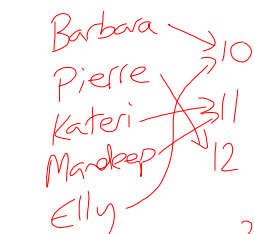
4. The grades and numbers of credits for students are listed.

Student	Grade	Number of Credits
Barbara	10	8
Pierre	12	25
Kateri	11	15
Mandeep	11	18
Elly	10	16

- a) Write a list of ordered pairs and create a mapping diagram for the relation between
- students and grades
  - grades and numbers of credits
  - students and numbers of credits
- b) State the domain and range of each relation in part (a).
- c) Which relations in part (a) are functions? Explain.

Students  $\rightarrow$  Grades

- (Barbara, 10)
- (Pierre, 12)
- (Kateri, 11)
- (Mandeep, 11)
- (Elly, 10)



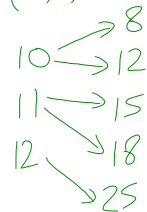
$$D = \{B, P, K, M, E\}$$

$$R = \{10, 11, 12\}$$

Function - each student can only be in one grade

Grades  $\rightarrow$  # Credits

- (10, 8)
- (12, 25)
- (11, 15)
- (11, 18)
- (10, 16)



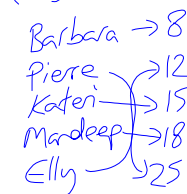
$$D = \{10, 11, 12\}$$

$$R = \{8, 12, 15, 18, 25\}$$

Not a function  
- 10 has two values  
- 11 has two values

Students  $\rightarrow$  # Credits

- (Barbara, 8)
- (Pierre, 25)
- (Kateri, 15)
- (Mandeep, 18)
- (Elly, 16)

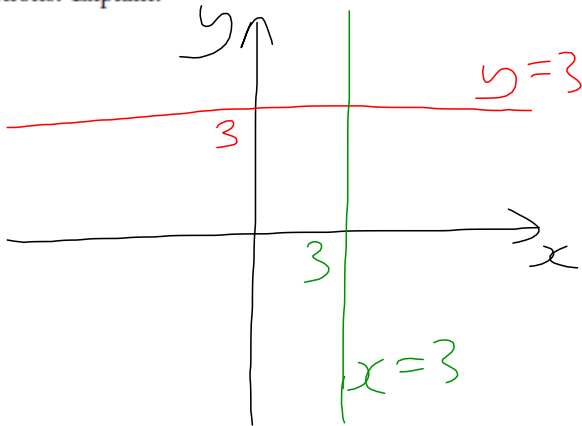


$$D = \{B, P, K, M, E\}$$

$$R = \{8, 12, 15, 18, 25\}$$

Function - each student has only one total of credits

6. Describe the graphs of the relations  $y = 3$  and  $x = 3$ . Are these relations functions? Explain.

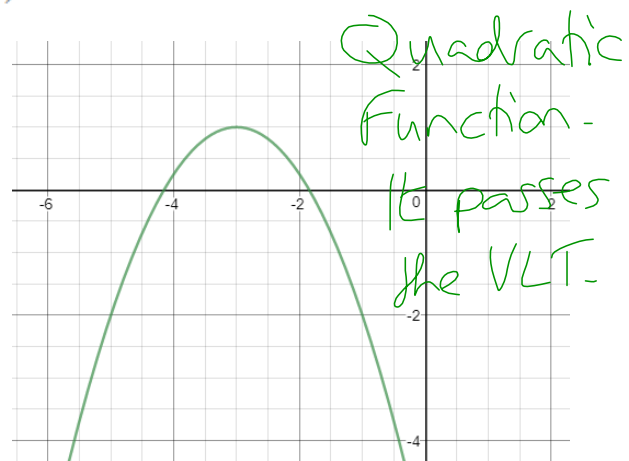
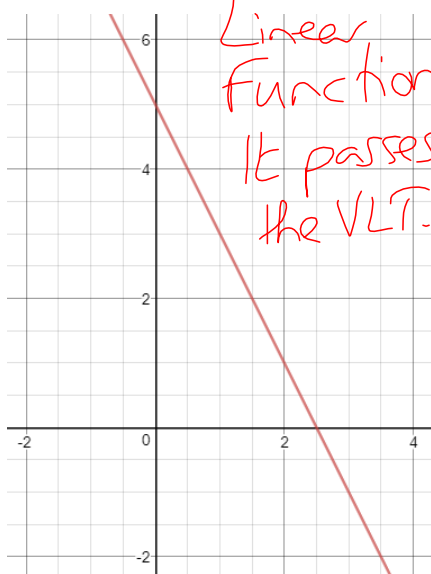


$y = 3$  is a function.  
Every value of  $x$  has only one value of  $y$  (3).  
It gives a horizontal line.

$x = 3$  is not a function.  
 $x$  has only one value (3) which gives multiple values of  $y$ .  
The vertical line fails the VLT.

7. Identify each type of relation and predict whether it is a function. Then graph each function and use the vertical-line test to determine whether your prediction was correct.

a)  $y = 5 - 2x$       c)  $y = -\frac{3}{4}(x + 3)^2 + 1$

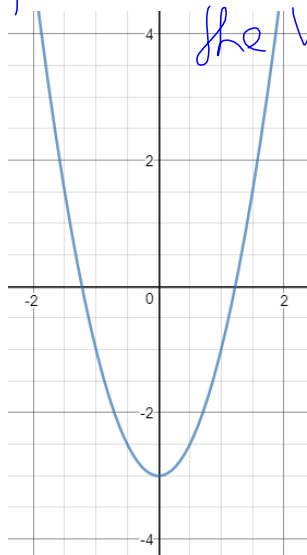


7. Identify each type of relation and predict whether it is a function. Then graph each function and use the vertical-line test to determine whether your prediction was correct.

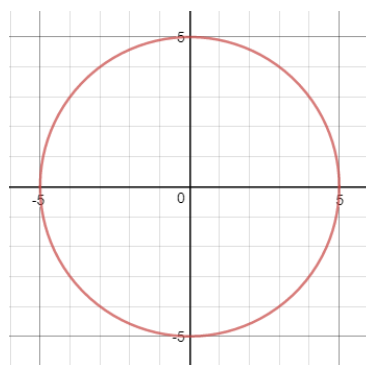
b)  $y = 2x^2 - 3$

d)  $x^2 + y^2 = 25$

Quadratic function. It passes the VLT.



Circle relation. It fails the VLT.



9. Determine which relations are functions.

a)  $y = \sqrt{x+2}$

c)  $3x^2 - 4y^2 = 12$

Root  $\Rightarrow$   
function

Circle  $\Rightarrow$  relation

b)  $y = 2 - x$

d)  $y = -3(x+2)^2 - 4$

Linear  $\Rightarrow$   
Function

Quadratic  $\Rightarrow$  Function