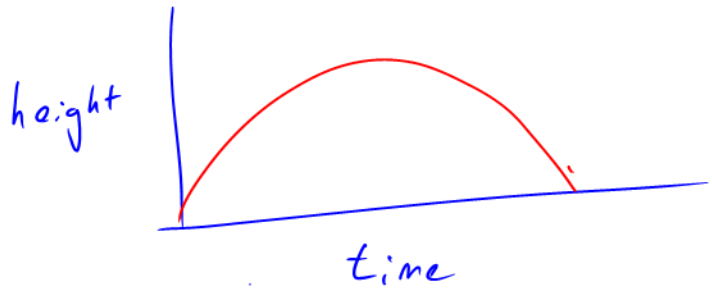
February 3, 2015

1.1 Relations and Functions

Definitions:

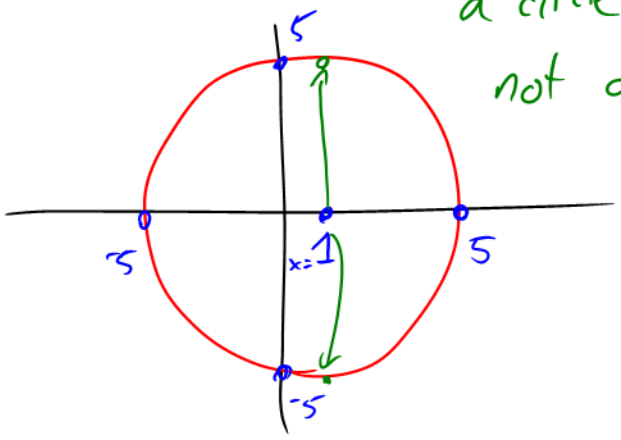
→ Independent variable :- usually the input of an equation
- "x"



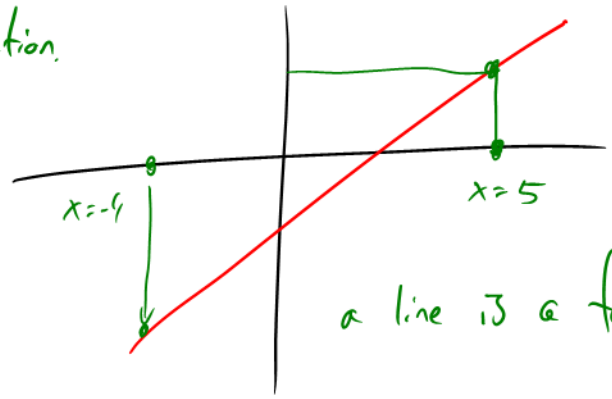
→ Dependent variable : - this variable depends on the independent variable
- the output
- "y"

→ Relation : any equation that relates an x and y

→ Function :- a relation where each independent variable corresponds with one dependent variable
- each input has one output
- each question has one answer



a circle is not a function.



a line is a function.

$y = 2x^2 + 3$, $x = 4$

$y = 2(4)^2 + 3$

$y = 35$

This is a function!

$y^2 = x - 1$, $x = 5$

$y^2 = 5 - 1$

$y^2 = 4$

$y = \pm\sqrt{4}$

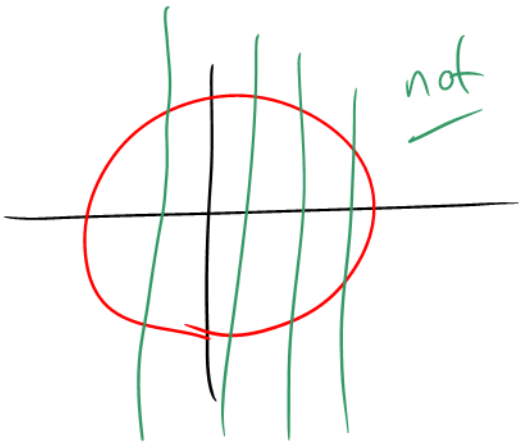
$y = \pm 2$

$(5, 2)$

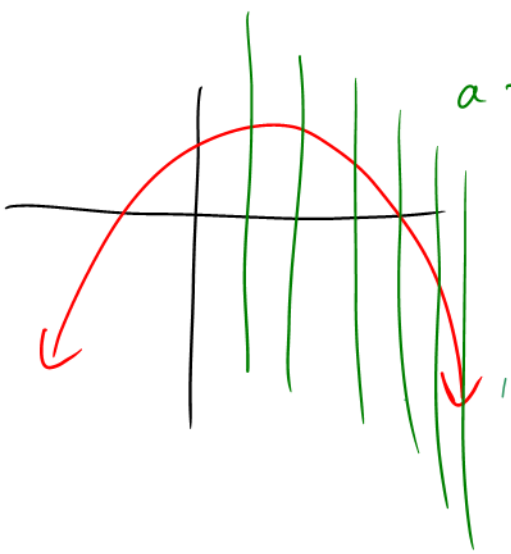
$(5, -2)$

Not a function

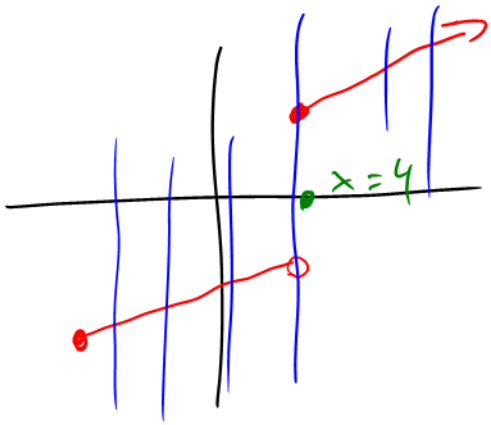
Vertical Line Test (VLT): a visual test to see if the graph is a function. Draw vertical lines on the graph. If any vertical line touches the graph more than once, it is not a function.



not



a function.

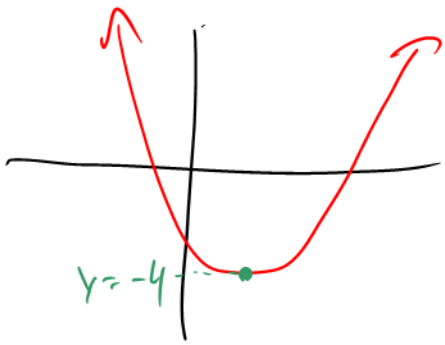


● means including or =

○ does not include.

Domain: the list of all possible independent values for the relation/function

Range: the list of all possible dependent values for the relation/function.



Domain: all x's

Range: greater than -4

Homework: pg 10 #2 def → Domain Range

4, 6, 7, 11, 12

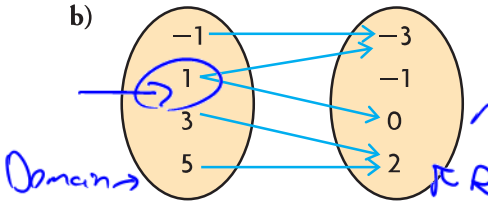
CHECK Your Understanding

D: {-5, -3, -1, 1}
R: {1, 2, 3}

1. State which relations are functions. Explain.

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

b)

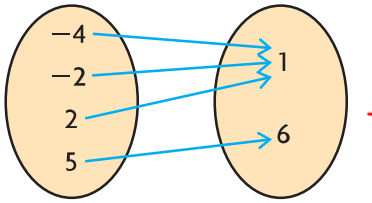


Domain → Range

not a function

c) $\{(0, 4), (3, 5), (5, -2), (0, 1)\}$ — not a function.

d)

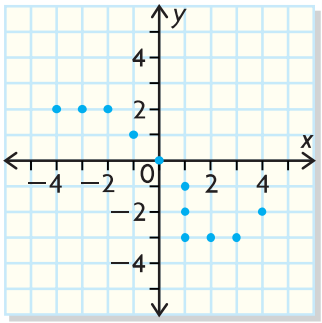


— a function

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

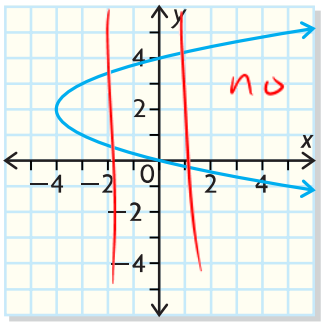
Domain: {-4, -3, -2, -1, 0, 1, 2, 4}
Range: {-3, -2, -1, 0, 1, 2}

a)

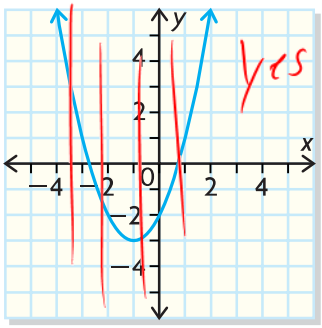


Domain: {x ≥ -4}
Range: {all y's}

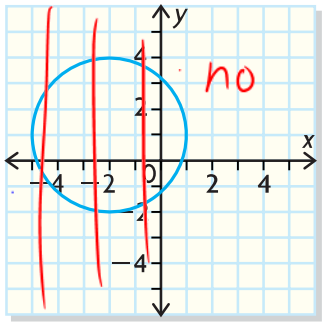
b)



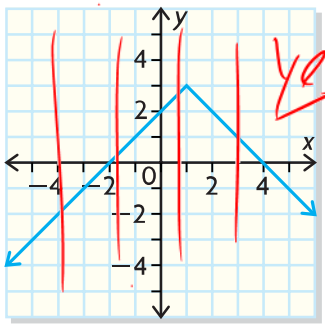
c)



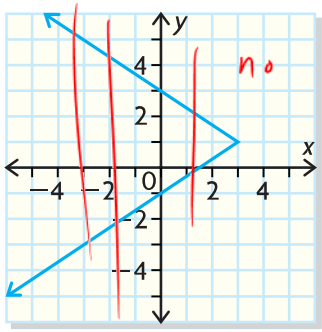
d)



e)



f)



3. Substitute -6 for x in each equation and solve for y. Use your results to explain why $y = x^2 - 5x$ is a function but $x = y^2 - 5y$ is not.