

Mathematics 11U

1.1 – Relations and Functions

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Definitions:

domain

the set of all values of the independent variable of a relation

→ *x-variable*

range

the set of all values of the dependent variable of a relation

→ *y-variable*

relation

a set of ordered pairs; values of the independent variable are paired with values of the dependent variable

$(2, 3)$
 $y = 3x + 5$ $x^2 + y^2 = 27$

function

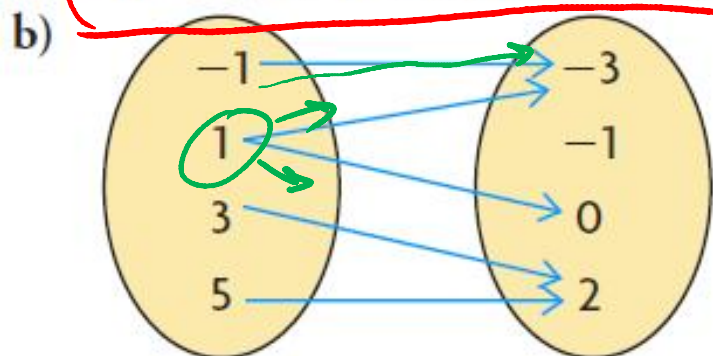
a relation where each value of the independent variable corresponds with only one value of the dependent variable

each "x" produces only one "y"

From your text: pg 10 #1.

State the domain, range and whether it is a function.

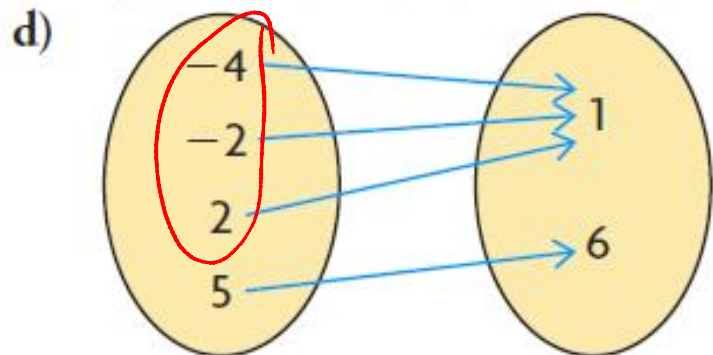
a) $\{(-5, 1), (-3, 2), (-1, 3), (1, 2)\}$ $D: \{-5, -3, -1, 1\}$ $R: \{1, 2, 3\}$ Is a fn



$D: \{-1, 1, 3, 5\}$ $R: \{-3, 0, 2\}$ not a fn

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

$D: \{0, 3, 5\}$ $R: \{4, 5, -2, 1\}$ not a fn



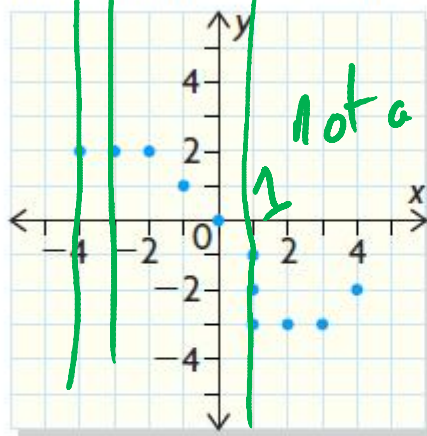
$D: \{-4, -2, 2, 5\}$ $R: \{1, 6\}$ Is a fn

VLT:

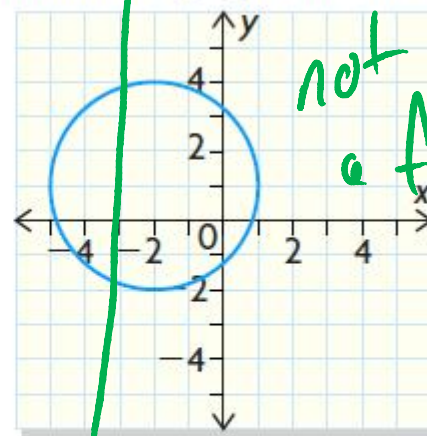
-draw vertical lines on the graph. If any line touches the graph more than once, it is not a function.

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

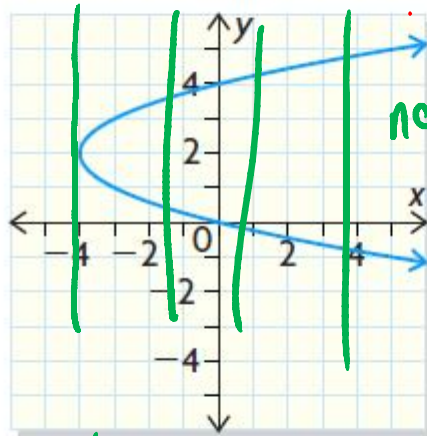
a)



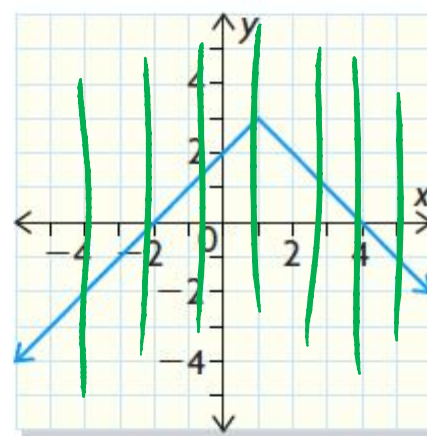
d)



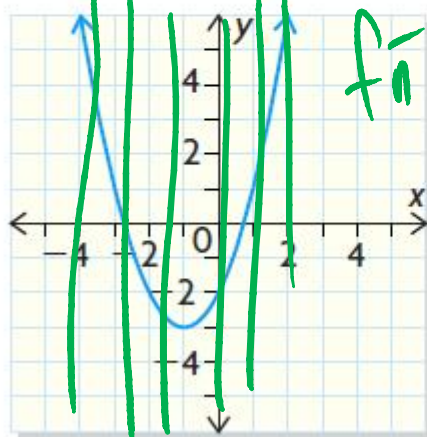
b)



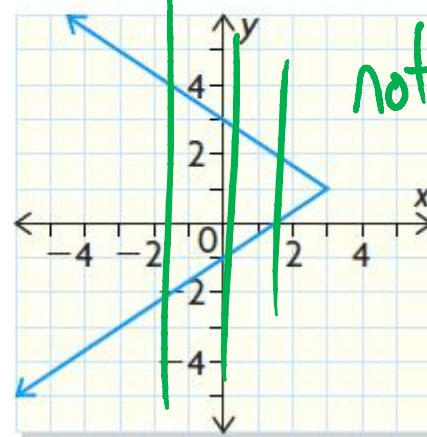
e)



c)



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.

$$y = (-6)^2 - 5(-6)$$

$$y = 36 + 30$$

$$y = 66.$$

This is a function because
 $x = -6$ produces only

$$y = 66.$$

$$(-6, 66)$$

$$-6 = y^2 - 5y + 6$$

$$0 = y^2 - 5y + 6$$

$$0 = (y-2)(y-3)$$

$$\uparrow$$
$$y = 2$$

$$\uparrow$$
$$y = 3$$

$$\therefore (-6, 2) \text{ and } (-6, 3)$$

-6 produced 2 values,
 \therefore not a fn.