5) RELATIONS & FUNCTIONS: CONTINUOUS/DISCRETE & VERTICAL LINE TEST

Warm-Up: Students at Reynolds are selling t-shirts during lunch for $10 each.

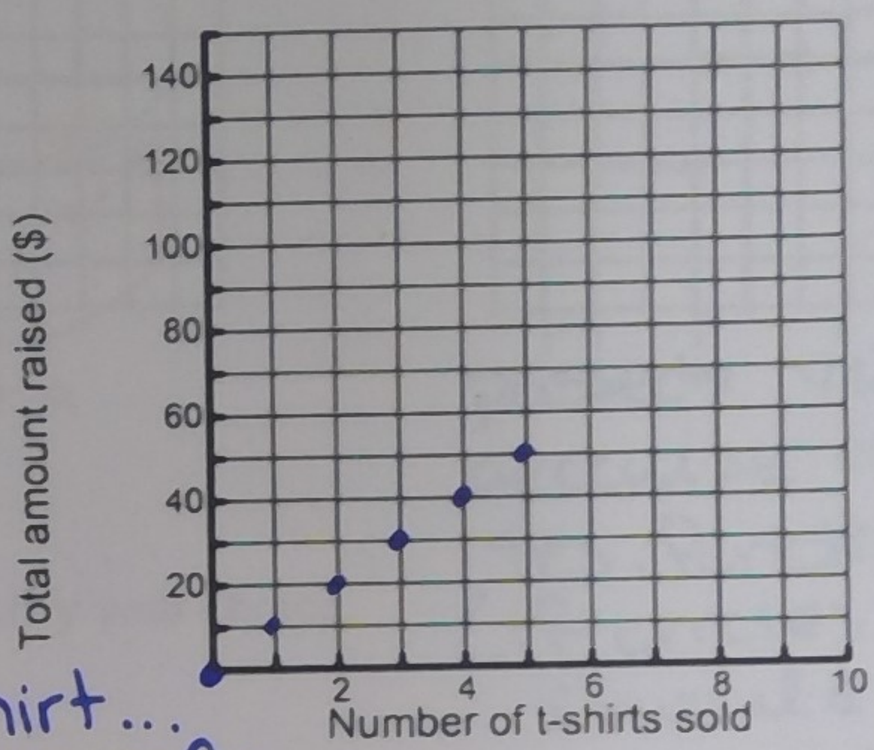
a) Complete the following table of values:

$y = x \cdot 10 = 10x$

Number of t-shirts sold	Total amount of money made, in dollars
0	0
1	10
2	20
3	30
4	40
5	50

b) Graph the relation:

(0,0), (1,10), (2,20), (3,30), (4,40), (5,50)



c) Can the dots be connected? Explain.

NO! Cannot sell part of a T-shirt... whole numbers only.

d) Fill in the table below, and add in your own example in.

Type of Data	*Continuous* connect points	*Discrete* (dots are NOT connected)
Characteristics	• Graph will appear as Line. • Occurs when quantities don't "skip" values. (or exclude) • Occurs when having parts/fractions of quantities makes sense. (is allowed)	• Graph will appear as series of points (scatterplot) • Occurs when quantities can only be specific or whole items. • Occurs when part numbers do not make sense.
Example	• Time • Age • Temperature • Height • Distance	• T-shirts • # students • pieces of cake

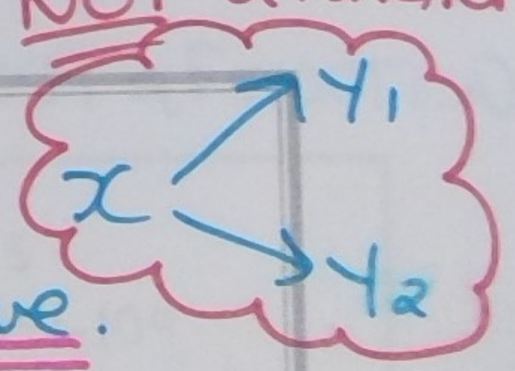
Introduction to Functions

A function is special type of relation.

. for every x-value, there is only 1 y-value.

(if there are repeated x-values, it is not a function)

NOT a function



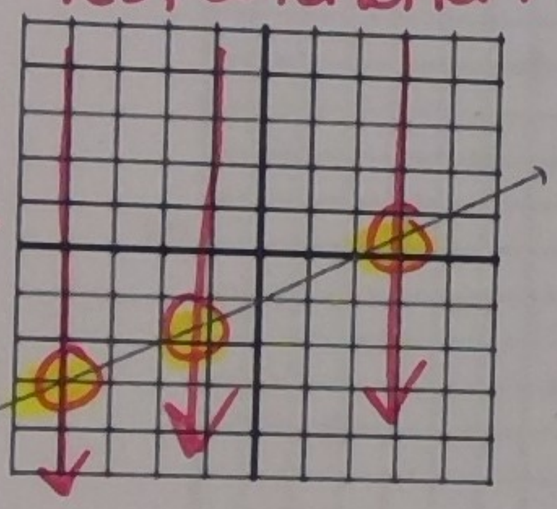
When a relation is presented as a graph, a quick method to determine whether or not it is a function is known as the **VERTICAL LINE TEST**.

> If a vertical line intersects the graph at more than one point, the relation **IS NOT** a function.

NOTE: vertical.

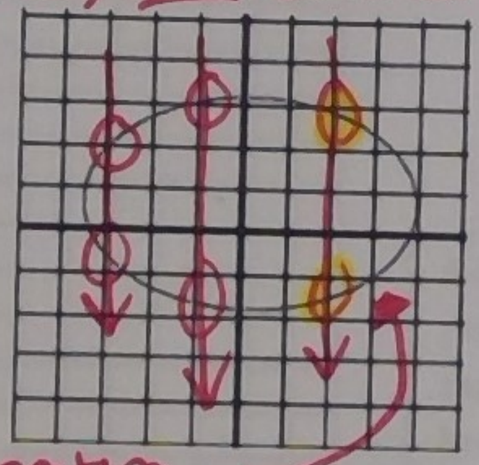
Example #1: Do these graphs represent functions? draw vertical lines.

a) Yes, a function



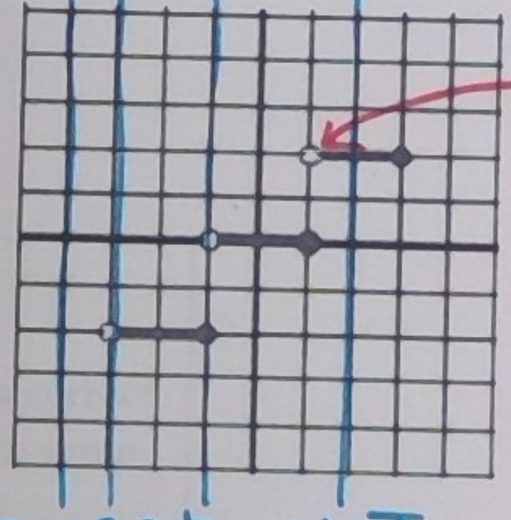
No matter where you draw the vertical line, it crosses only once.

b) No, NOT a function



Intersecting twice ... not a function. (fails VLT)

c)



NOTE: open circle, point NOT included

passes VLT only because of open O

Yes, function.
(if circles were closed, it would fail VLT.)

Example #2: Do these relations represent functions? Justify your choice.

a) $\{(1,3), (2,4), (3,5), (4,3), (2,1)\}$

x=2 y=4 and 1 ∴ 2 y-values for 1 x-value. NOT a function.

b)

Name	Shoe Size
Andrew	10
Nathan	11
Joel	12
Aaron	13
Simon	12

no repeats

no repeats

Yes, FUNCTION.

c)

x: Name	y: Sibling
Anika	Jared
Anika	Joel
Anika	Nathan
Caroline	Aaron
Caroline	Simon

repeats. ∴ NOT a function

d) $y = 3x + 5$ $(y = mx + b)$

∴ FUNCTION

↑ Line.

e) $y^2 = x$

$(-2)^2 = 4$

x	y
-2	4
-1	1
0	0
2	4

repeating/ multiple x-values

∴ NOT a FUNCTION

Homework

ASSIGNMENT # 5

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