

Benchmark 2 Study Guide

I can determine whether a relation is a function or non-function.

A relation is any set of Ordered pairs. A function is a relation where each input is paired with only one output. To determine if a relation is a function check to see if any x values repeat. If no x-values repeat, or if one repeats with the same y, then the relation is a function. If any x-value repeats with different y-values, the relation is a nonfunction.

For each relation shown below, write function or non-function.

x	y
2	2
3	2.5
6	4

x	y
-1	2
0	3
-1	4

(-7,-6) (-4,-3) (4,5) (5,6) (6,7)

Function

(-4,3) (-2,2) (-4,0) (5,8) (6,10)

nonfunction

Function non function
(-1, 2) & (-1, 4)

I CAN DETERMINE WHETHER A FUNCTION IS LINEAR OR NONLINEAR.

Some functions are linear and some are nonlinear. Linear functions are ones that show a straight line on a graph, and they also have a Constant rate of change. To determine if a function is linear or nonlinear check the rate of change between each set of ordered pairs (remember that rate of change is $\frac{\text{change in } y}{\text{change in } x}$). If the simplified unit rate is the same for each set of pairs, the function is linear; otherwise, the function is nonlinear.

You may see notation that looks like this. This is called function notation. For our purposes, we can consider these to be x and y.

For each function shown below, write linear or nonlinear.

x	y
2	8
4	9
6	10
8	9

Non linear
 $\frac{1}{2} \neq -\frac{1}{2}$

x	f(x)
-4	-8
-2	-4
0	0
2	4
4	8

Linear
 $m = \frac{4}{2} = \frac{2}{1}$

x	0	1	2	3	4
f(x)	0	1	4	9	16

non linear

x	1	3	7
g(x)	4	9	19

Linear

$\frac{5}{2} = \frac{10 \div 2}{4 \div 2}$

I can determine the function rule and use it to answer questions.

The table below shows that the total amount charged, in dollars, by a hot dog vendor is a function of the number of hot dogs purchased.

Vendor Charges

Number of Hot Dogs	Total Charge
1	\$3
2	\$6
3	\$9
4	\$12
5	\$15

What is the function rule for the table? - *What is the pattern?*
 $y = 3x$
 What is the domain of the function? *domain = list of all x values*
 $\{1, 2, 3, 4, 5\}$
 What is the range of the function? *range = list of all y-values*
 $\{3, 6, 9, 12, 15\}$

Given the linear function $y = 5x - 8$, what are the missing input and output values in the table shown to the right?

Missing input = 4
 Missing output = 32

$y = 5x - 8$
 $12 = 5x - 8$
 $+8 \quad +8$
 $\frac{20}{5} = \frac{5x}{5}$
 $4 = x$
 $y = 5x - 8$
 $y = 5(8) - 8$
 $y = 40 - 8$
 $y = 32$

Input (x)	Output (y)
-2	-18
0	-8
1	-3
?	12
8	?

A function is represented by the equation $c = 15 + 20d$. It shows the total cost, c , of renting a wallpaper hanger from a home improvement store for d days.

What is the independent variable in this situation?

days (d)

How much would it cost to rent the hanger for 3 days?

\$75

$c = 15 + 20(3)$
 $c = 15 + 60$
 $c = 75$

Amber needs to hang wallpaper in her bathroom. She can only pay \$135 to rent the hanger.

How long will she have to hang her wallpaper?

6 days

$135 = 15 + 20(d)$
 $-15 \quad -15$
 $\frac{120}{20} = \frac{20d}{20} \quad d = 6$

Given the function rule $y = -\frac{1}{2}x + 3$, determine the outputs for the inputs listed in the table below.

x	y
-2	4
0	3
2	2
4	1
6	0

$y = -\frac{1}{2}(\quad) + 3$
 ↑
 plug in each x value & simplify