

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 X is paired with only one Y. 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 non-function.

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 nonfunction

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.

For each function shown below, write linear or nonlinear.

x	y
2	8
4	9
6	10
8	9

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

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

nonlinear

x	g(x)
1	4
3	9
7	19

Linear

nonlinear linear

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

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 domain of the function?

domain $\{1, 2, 3, 4, 5\}$

What is the range of the function?

range $\{3, 6, 9, 12, 15\}$

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

$$y = 5x - 8$$

$$y = 5(8) - 8$$

$$y = 40 - 8$$

$$y = 32$$

$$12 = 5x - 8$$

$$+8 \quad +8$$

$$\frac{20}{5} = \frac{5x}{5} \quad x = 4$$

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?

$d = \text{days}$

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

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

$$c = 15 + 60$$

$$c = \$75$$

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?

$$135 = 15 + 20d$$

$$\begin{array}{r} 135 = 15 + 20d \\ -15 \quad -15 \\ \hline 120 = 20d \\ \frac{120}{20} = \frac{20d}{20} \end{array}$$

$d = 6 \text{ days}$

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

$$y = -\frac{1}{2}(-2) + 3$$

↑
plug in x value