Lesson FN – 4

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Objective: Finding the Rate of Change / Slope of a Linear Function

Homework FN4 – The Doctor's Dark Journey to Rate of Change Practice

Do Now: Use the table at the right.

1. Write the next two lines of the table.
2. Write a function rule for the table.
3. Does the range have any negative values?

x	*y*
2	6
3	11
4	18
5	27

Exam Prep: The range of the $y = x^2 - 3$ whose domain is {2, 4, 6} is:

A) {–1, 1, 3} B) {1, 5, 9} C) {1, 1, 9} D) {1, 13, 33}

The Rate of change of a function is the relationship between the dependent variable (y) and independent variable (x). It can be obtained from an equation, table or graph.

$$\text{Rate of Change} = \text{slope} = m = \frac{\text{dependent change}}{\text{independent change}} = \frac{\triangle x}{\triangle y} = \frac{y_2 - y_1}{x_2 - x_1}$$

Finding Rate of Change on a Table

To find rate of change in a table, choose any coordinates and observe how the x and y values change.

Here the rate of change is $\frac{3}{2}$ because as the y-value increases by 3, the x-value increases by 2.

x	y	
–2	1	
0	4	+3
2	7	+3
4	11	+3
6	15	+3
+2		
+2		
+2		
+2		

Try it Out: Find the Rate of Change

1. m = ——

x	y
0	6
1	8
2	10
3	12
4	14

2. m = ——

x	y
–2	3
–1	3
0	3
1	3
2	3

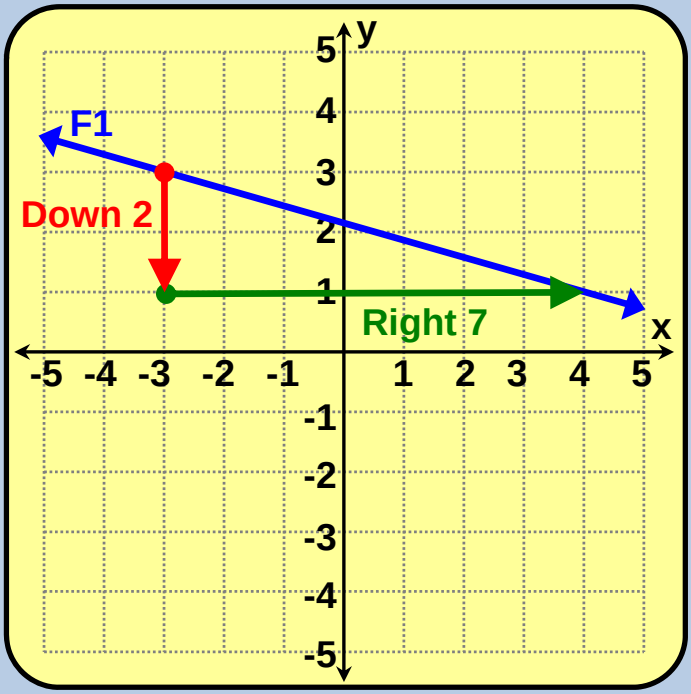
3. m = ——

x	y
3	10
5	5
7	0
9	–5
11	–10

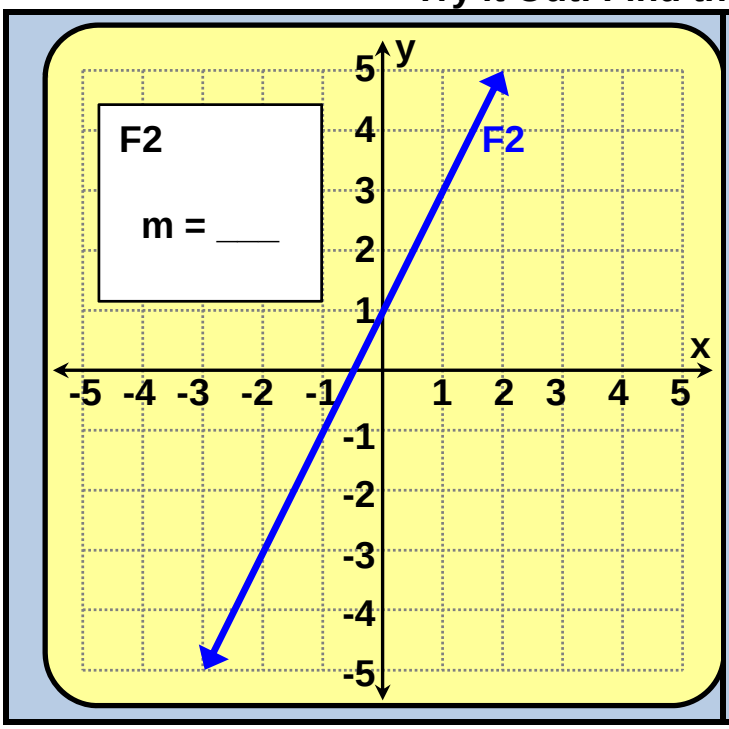
Find it on a Graph

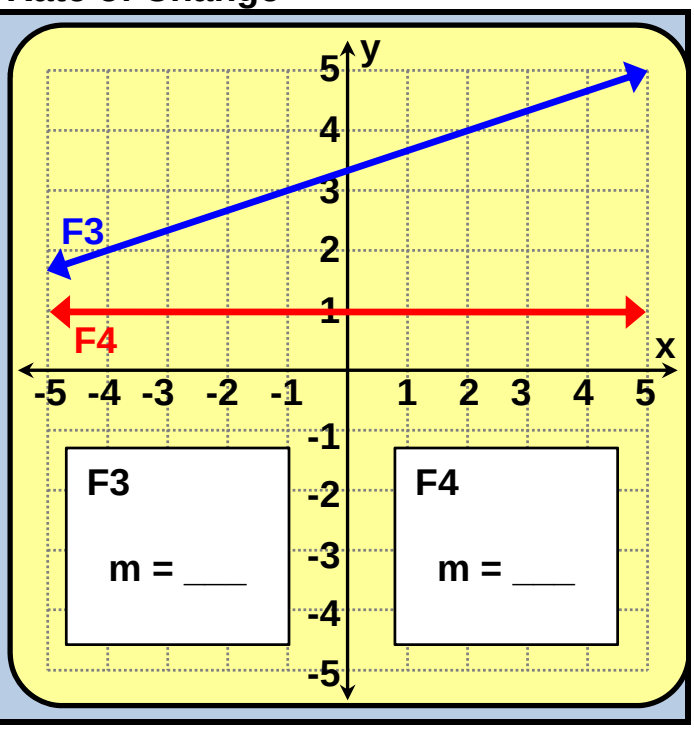
To find the rate of change on a graph, just pick any two points and visually follow the path from left to right.

Here the rate of change of F1 is $\frac{-2}{7}$ because as the y-value decreases by 2, the x-value increases by 7.



Try it Out: Find the Rate of Change





Find it in an Equation

In an equation, the rate of change is always the coefficient of x.

In the equation y = 3x + 2, the rate is m = 3.

1. $y = \frac{1}{3}x + 1$ m =
2. $y = -10$ m =
3. $y = 20x + 20$ m =

A Very Special Note from The Doctor

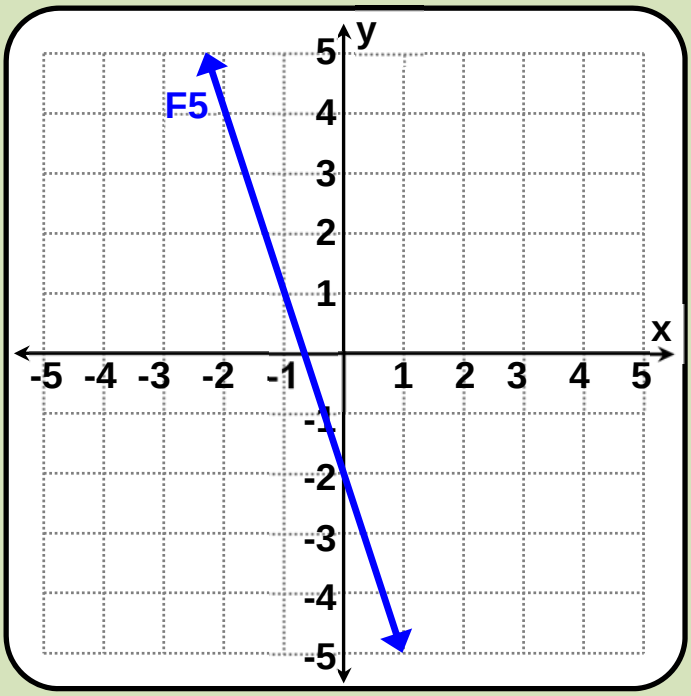
When looking for the rate of change in a table, on a graph, or in an equation you must remember that all three representations of a function give you access to coordinates. At any time you may choose two coordinates and plug them into the formula given.

$m = \frac{y_2 - y_1}{x_2 - x_1}$

Ex: Using (3, 4) and (1, 7), you get $m = \frac{7-4}{1-3}$ **This is** $m = -\frac{3}{2}$

Try it out! Show Substitution! Compare to earlier work!	1. (2, 5) and (6, 5)	2. (–1, 16) and (3, 9)	3. (–2, 3) and (–2, 0)

Compare Functions: Which has a Greater Rate of Change



F6

x	y
1	4
3	8
5	12
7	16
9	20

F7: $y = \frac{1}{3}x - 11$

First find m.

F5: m = _____

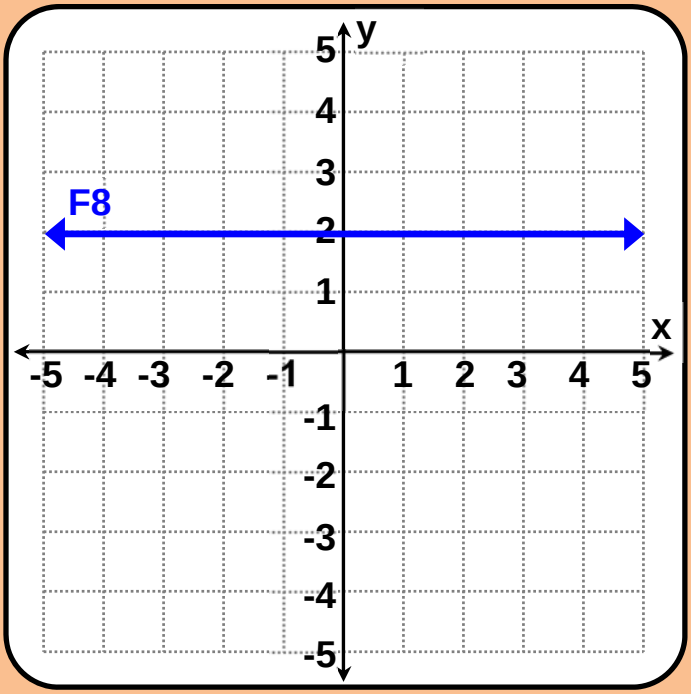
F6: m = _____

F7: m = _____

Compare "m" values using > or <.

F5 ◯ F6 F6 ◯ F7 F5 ◯ F7

More Practice Comparing Functions: Pairs in Different Representation



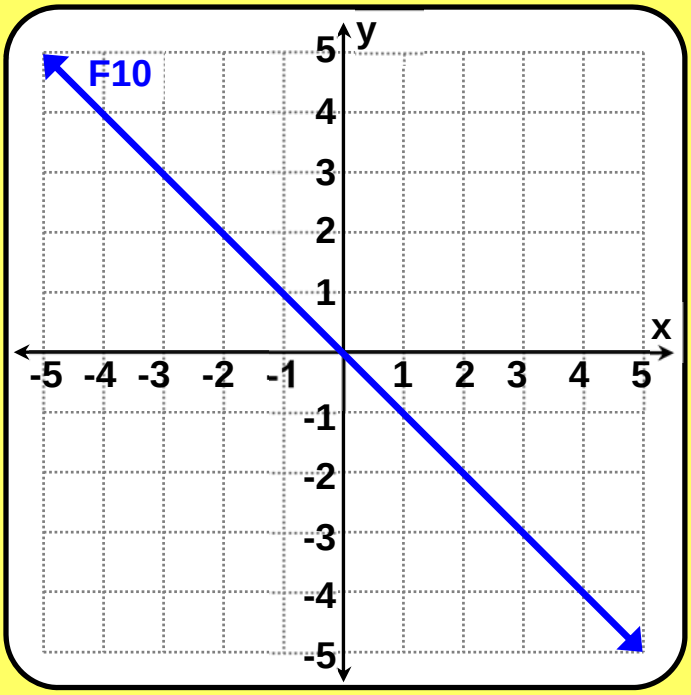
F8 m = ____

Which has the greater rate of change?

F9

x	y
10	11
12	33
14	55
16	77
18	99

m = _____



F10 m = ____

Which has the greater rate of change?

F11

$y = x + 1$

m = ____

F12

x	y
1	1
5	–2
9	–5
13	–8
17	–11

m = ____

F13 $y = -\frac{4}{3}x + 1$

m = ____

Which has the greater rate of change?