GGG Inv 2 & 3 Quiz Study Guide

* Be able to determine if each table, graph, mapping, set of coordinate points are a function.
* Be able to state the domain and range from a set of coordinate points.
* Read a story and use the information in the story to complete a table and write a linear equation for the situation.
* Use your linear equation to answer questions about the story.
* Read a story and use the information in the story to complete a table and write an exponential equation for the situation.
* Use your exponential equation to answer questions about the story.
* Express each **growth rate** as a growth factor.
* Express each **growth factor** as a growth rate.

In order for a relation to be considered a function, each member of the domain (x), must be paired with only one member of the range (y).

I usually say, "For every input, there is exactly one output." Students seem to remember this.

If a member of the domain is paired with more than one value in the range, then it is NOT a function.

This is a function because...

Every 'x' is paired with a different 'y'.

x	y
1	5
2	10
3	15
4	20

This is NOT a function because...

A member of the domain is paired with more than one member of the range (x= 2 is paired with 10 and 20)

x	y
2	10
4	20
6	30
8	40

This is a function because...

Every 'x' is paired with a different 'y'. (It's okay for values in the range to repeat)

x	y
3	10
4	10
5	10
6	10

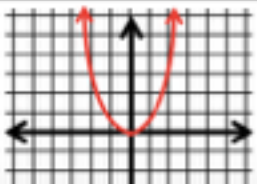
This is NOT a function because...

A member of the domain is paired with more than one member of the range (x= 4 is paired with 10 and 11)

x	y
4	10
4	11
8	12
12	13

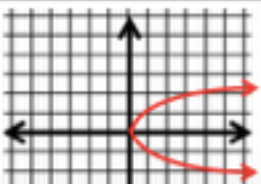
This is a function because...

It satisfies the vertical line test.



This is NOT a function because...

It does NOT satisfy the vertical line test.



The **domain** of a set of points are all the x values listed in order. Repeated values are not listed.
The **range** of a set of points are all the y values listed in order. Repeated values are not listed.

EXAMPLE: {(3, 5), (-2, 3), (0, 4), (3, 3)} Domain: _____ Range: _____

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Porky decides he's going to start a pig farm. He has 4 pigs. After 6 months he has 6 pigs. After a year he has 8 pigs, and at 18 months Porky has 10 pigs.

Create a table of the data, write an equation. _____

How many pigs will Porky have at 5 years? _____

How long will it take Porky to have 50 pigs? _____

Are Porky's pigs growing linearly or exponentially? _____

How do you know? _____

What is Porky's rate of change? _____

Porky's Pigs	
Time (years)	# of Pigs
0	
0.5	
1	
1.5	
2	
2.5	

Porky's friend Penelope also decides to start a pig farm. She also starts with 4 pigs and at a year has 7 pigs. Two years after opening her farm, Penelope has 12 pigs and by three years, Penelope has 21 pigs.

Create a table of the data, write an equation. _____

How many pigs will Penelope have at 8 years? _____

How long will it take Penelope to have 1,000 pigs? _____

Are Penelope's pigs growing linearly or exponentially? _____

How do you know? _____

What is Penelope's growth rate? _____

Penelope's Pigs	
Time (years)	# of Pigs
0	
1	
2	
3	
4	
5	

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Growth Factor: This is the amount multiplied by each time

Growth Rate: This is the **percent of increase or percent of change**

Growth Rate (or Percent of change) = $\frac{\text{Change in the data}}{\text{Starting value in the data}}$

TO CHANGE GROWTH FACTOR TO GROWTH RATE:

Change the growth factor to a % by multiplying by 100. Then subtract 100.

Example: Growth Factor of 3.2
3.2 x 100 = 320%. Then - 100 = 220%. So the growth rate is 220%

TO CHANGE GROWTH RATE TO GROWTH FACTOR:

Change to a decimal by ÷ 100. Then add 1.

Example: Growth Rate of 110%
110% = 1.10 Then add 1. So the growth factor is 2.1

Change each **growth factor** into a growth rate.

12% = _____ 102% = _____ 4.2% = _____

Change each **growth rate** into a growth factor.

6.2 = _____ 2 = _____ 3.25 = _____

Henry deposits $150 in the bank. The bank will pay 3.2% interest each year.

Write an equation for calculating the balance (***b***) at the end of any year (***t***).

_____

Approximately how many years will it take for the original deposit to double in value?

_____

Henry's Savings	
Time (years)	Balance
0	
1	
2	
3	
4	
5	

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PRACTICE PROBLEM ANSWERS

EXAMPLE: {(3, 5), (-2, 3), (0, 4), (3, 3)} Domain: {-2, 0, 3} Range: {3, 4, 5}

Porky decides he's going to start a pig farm. He has 4 pigs. After 6 months he has 6 pigs. After a year he has 8 pigs, and at 18 months Porky has 10 pigs.

Create a table of the data, write an equation. **y = 4x + 4**
The number of pigs increases by 4 every year and start with 4.

How many pigs will Porky have at 5 years? **24**

How long will it take Porky to have 50 pigs? **50 = 4x + 4 so x = 11.5**

Are Porky's pigs growing linearly or exponentially? **linearly**

How do you know? **The number of pigs increases by 4 each year.**

What is Porky's rate of change? **4**

Porky's Pigs	
Time (years)	# of Pigs
0	**4**
0.5	**6**
1	**8**
1.5	**10**
2	**12**
2.5	**14**

Porky's friend Penelope also decides to start a pig farm. She also starts with 4 pigs and at a year has 7 pigs. Two years after opening her farm, Penelope has 12 pigs and by three years, Penelope has 21 pigs.

Create a table of the data, write an equation. **$y = 1.75^x(4)$**
y = growth ratex·y-intercept
growth rate = year ÷ previous year

How many pigs will Penelope have at 8 years? **352**

How long will it take Penelope to have 1,000 pigs? **just over 10 years**

Are Penelope's pigs growing linearly or exponentially? **exponentially**

How do you know? **You need to multiply each year by 1.75 to find the number of pigs for the next year (instead of adding)**

What is Penelope's growth rate? **1.75**

Penelope's Pigs	
Time (years)	# of Pigs
0	**4**
1	**7**
2	**12**
3	**21**
4	**37**
5	**65**

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Change each **growth factor** into a growth rate.

12% = **1.12** 102% = **2.02** 4.2% = **1.042**

Change each **growth rate** into a growth factor.

6.2 = **520%** 2 = **100%** 3.25 = **225%**

Henry deposits $150 in the bank. The bank will pay 3.2% interest each year.

Write an equation for calculating the balance (***b***) at the end of any year (***t***).

$b = 1.032^t(150)$

Approximately how many years will it take for the original deposit to double in value?

23 years

Henry's Savings	
Time (years)	Balance
0	**150**
1	**154.80**
2	**159.75**
3	**164.86**
4	**170.13**
5	**175.57**