

You were supposed to complete this side this weekend

GSE Honors Algebra 1

2.0 - Arithmetic vs. Geometric

Name: _____

Linear vs. Exponential

Is the following sequence arithmetic or geometric?

10, 4, -2, -8...

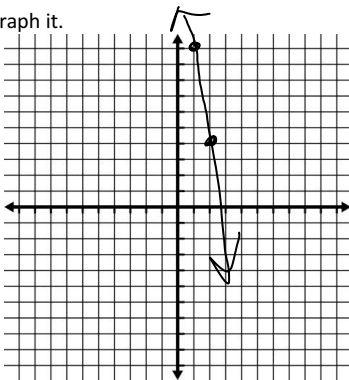
How do you move from one number to the next?

-6

Let's create the explicit equation:

$$10 - 6n$$

Now let's graph it.



What do you notice about the dots? What shape do they make?

Linear

How are you moving from one dot to the next?

down 6

Can we create a new equation using x?

$$-6x + 10 \text{ OR } 10 - 6x$$

Arithmetic is the same as Linear

So when we create an explicit equation, it is the same thing as creating Linear equation

Linear equation:

$$y = mx + b$$

Is the following sequence arithmetic or geometric?

$\frac{1}{2}$, 1, 2, 4, 8...

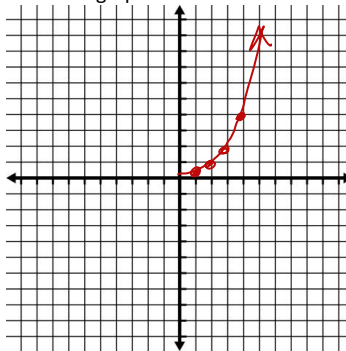
How do you move from one number to the next?

x2

Let's create the explicit equation:

$$\frac{1}{2}(2)^{n-1}$$

Now let's graph it.



What do you notice about the dots? What shape do they make?

Curve, exponential

How are you moving from one dot to the next?

x2

Can we create a new equation using x?

$$\frac{1}{2}(2)^{x-1}$$

Geometric is the same as exponential

So when we create an explicit equation, it is the same thing as creating exponential equation

Exponential equation:

$$y = a(b)^x$$

Let's practice

1) 5, 9, 13, 17...

What is the common difference?

+4

What is the explicit equation?

$$1 + 4n$$

Can you create the linear equation?

$$1 + 4x$$

What would be your slope?

4

Y-int?

(0, 1)

What is another name for slope?

Common difference

Y-int?

0 term

2) -3, -5, -7, -9...

What is the common difference?

What is the explicit equation?

Can you create the linear equation?

What would be your slope?

Y-int?

What is another name for slope? Y-int?

4) $1/3, 1, 3, 9...$

What is the common ratio?

$\times 3$

What is the explicit equation?

$$\frac{1}{3}(3)^{n-1}$$

Can you create the exponential equation?

$$\frac{1}{3}(3)^{x-1}$$

What would be your ratio?

3

Y-int?

(0, 1/9)

What is another name for the ratio?

base

Y-int?

0 term

5) 128, 64, 32, 16...

What is the common ratio?

What is the explicit equation?

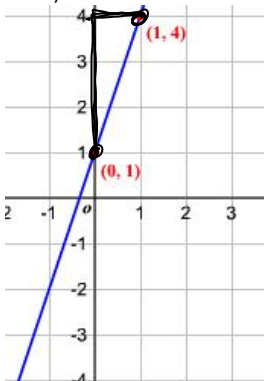
Can you create the exponential equation?

What would be your ratio?

Y-int?

What is another name for the ratio? Y-int?

3)



What is the slope?

+3

What is the y-int?

(0, 1)

Can you create the equation of a line?

$$y = 3x + 1$$

Can you create the explicit equation?

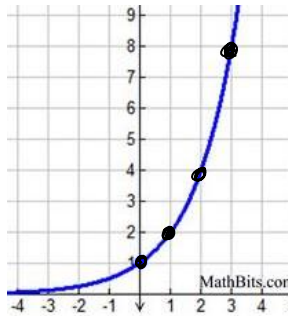
$$a_n = 3n + 1$$

What kind of sequence

would this be?

Arithmetic

6)



What is the y-int?

(0, 1)

What is the ratio?

$\times 2$

Can you create the exponential equation?

$$1(2)^x$$

Can you change that to the explicit equation?

$$1(2)^n$$

What kind of sequence

would this be?

Geometric

Word problems

9. You and your little sister are collecting stray dogs. You start off with 2 and every week you find 3 more.

a. Linear or exponential

b. Discrete or continuous

Dogs R counted in whole #'s

c. Domain:

X-values weeks * start @ 0, whole #'s

d. Equation:

$$y = 2 + 3x$$

10. Something spilled in your backpack so your backpack is growing mold. The first hour there is 3cm^2 of mold in your backpack and for each hour you do not clean it out, the mold grows by a factor of 4.

a. Linear or exponential

b. Discrete or continuous goes on and on

c. Domain:

x-values hours → start @ 0, you can have parts of an hour

d. Equation:

$$y = 3(4)^{x-1}$$

11. Allowance: you present two options to your parents to earn your allowance money. **Option A** is you get paid \$20 per week. **Option B** is you start off with \$0.03 for week 1, \$0.09 for week 2 and each week after that is being tripled.

Create the equations for both option A and option B.

Option A:

$$y = 20x$$

Option B:

$$y = 0.03(3)^{x-1}$$

$0.03(3)^{8-1}$

\$

Graph the two equations. Be sure to LABEL!

What option is better? Why? What makes each better?

1st better short term - you get more \$

2nd - better after 9 weeks

Are there certain times that one option is better than the other? What's the number of weeks that they come together (equal the same)?

= same thing b/w 8 and 9 weeks

