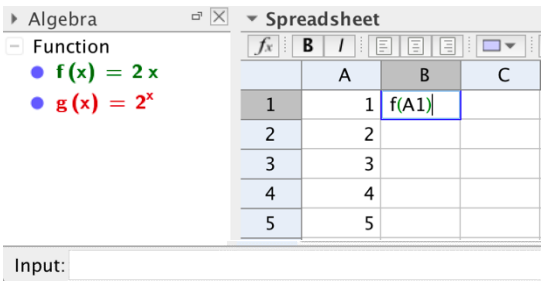
Geogebra

Set up the **View** with **Algebra**, **Spreadsheet**, and **Input Bar** (include **Graphics** too if desired).

Enter functions f(x), g(x), etc. in the Input Bar.

Enter *x*-values in column A of the spreadsheet. Use **Fill Down** to create a sequence of values. (Highlight two cells which define a first value and an increment, then drag the box to the target cells.)



In cell B1 of the spreadsheet, enter **f(A1)**. Highlight this cell and **Fill Down** to fill the remaining desired cells in column B.

Repeat: in cell C1, enter **g(A1)** and fill down.

Dynamic Tables option 1
To view the *y*-values one at a time, **Fill Down** one at a time.

Dynamic Tables option 2
To enter *x*-values one at a time, enter an *x*-value. Highlight both cells for the *y*-values, and **Fill Down** together.

Notes:

- To use row 1 as a "header" row, type "X" and "f(x)" with quotations in cells A1, B1, etc.
- To guarantee a fraction output, enter this command in the top cell: **fractiontext(f(A1))**
- Geogebra calculates in radians, so for *f(x)*=sin(*x*) and other trig functions, enter this in the top cell: **f(A1*π/180)** . The pi symbol is available on the Keyboard.

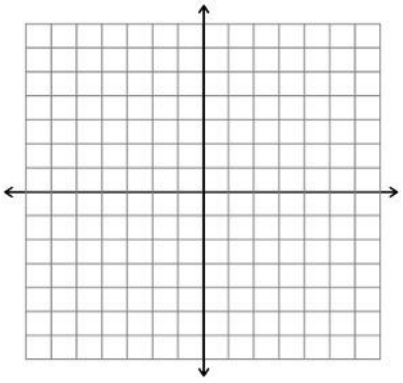
A blank GeoGebra applet for Table Techniques is at https://ggbm.at/uw5bqe6g

Growth Investigation: Linear Vs. Exponential

1

Graph these functions:
F(x)= 2x
G(x)= 2^x

What do you observe?



2

Look at the Table for these functions. Move <u>down</u> the column for each, **FILLING DOWN** for the value.

How does the Y-value change for **F(x)=** 2x?

How does the Y-value change for **G(x)=** 2^x?

At what point(s) do the graphs intersect?

X	**F(x)**=2x	**G(x)**=2^x

3

Graph these and examine the Table:

F(x)= 2+3x
G(x)= 2•3^x

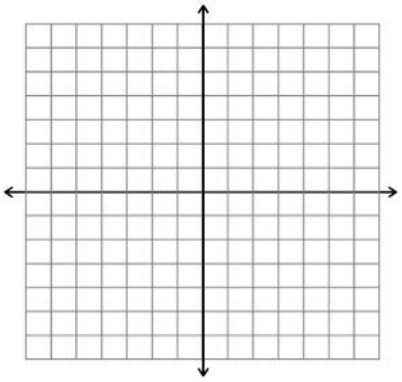
Sketch the graphs:

How are these similar to each other?

How does the Y-value change for each?

Which equation grows faster?

X	**F(x)**=2+3x	**G(x)**=2•3^x



4

What does the 2 in the first equation have in common with the 2 in the second equation?

What does the 3 do in each equation?

6

Equations like **F(x)** are called linear equations and have the form Y =

Equations like **G(x)** are called exponential equations and have the form Y =

Give the general form of each equation above, and state what each part of the equation represents.

7 Some values for the functions **f** and **g** are shown in the table.
One of the functions is linear. The other is exponential.
Use the patterns to complete the missing entries.

How does the Y-value change for each?

Which function increases faster?

Can you find an equation for each column?

X	f	g
0	2	2
1	12	20
2	22	200
3	32	
4		
5		200000
6	62	
7		

8 Which scenario grows faster?

A. You start with $110 savings and add $10 each week.	B. You start with $5 savings. Each week's total is double the amount you had the previous week.

Write an equation for each and enter them in the input bar.

In the table, enter the desired X-value. Then highlight both of the Y-value cells together and **FILL DOWN** to display both Y-values at the same time.

How much money do you have after 1 week in each scenario? In 4 weeks?

When does scenario B catch up with scenario A?

9

A. You have a population of 100 guppies, which increases by 25 guppies each year.	B. You have a population of 60 frogs, which increases by 25% each year.

Write an equation for each.

How many of each will there be in 3 years?

When do the frogs outnumber the guppies?

10

Job A. Salary of $25,000 with a 15% raise each year.	Job B. Salary of $25,000 with a $5000 raise each year.

Write an equation for each.

When will Job A have a higher salary than Job B?

Which would you rather have and why?