

Before we begin, are there any questions from last day's work?

106c

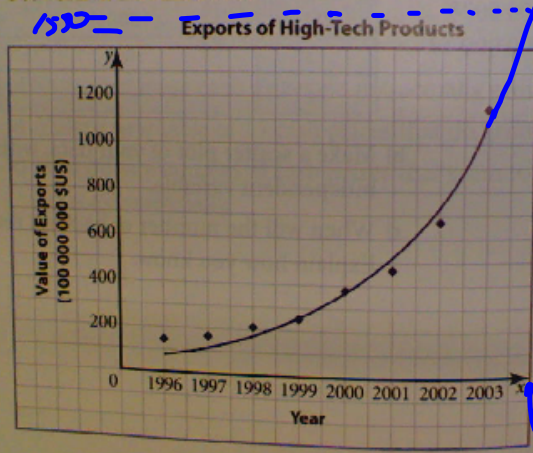
Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) analyse a table of values to decide if it represents a relation which is:
linear, quadratic, exponential, or "unknown"

p.380 # 10

10. The graph shows a scatter plot and a curve of best fit of total high-tech exports from China, in hundreds of millions of US dollars, between 1996 and 2003.



- a) Do you think the graph is an example of exponential growth? Explain.
- b) Assume the trend continued. What was the value of high-tech exports in 2004? What will it be in 2010?
- c) Do you think this trend will continue? Explain.

MBF 3CI

Graph-fest! *May 15/17*

INVESTIGATION:

1. Create a table of values for the following three relations.
Complete the first differences (FD), second differences (SD) and y-ratio columns too.
(The first few rows are done for you.)

$y = 2x$
 $y=2(\quad)$

x	y	FD	SD	y-ratio
0	0			
1	2	2		undefined
2	4	2	0	2
3	6	2	0	1.5
4	8	$8-6=2$	0	$\frac{8}{6}=1.33$
5	10	$10-8=2$	0	$\frac{10}{8}=1.25$
6	12	$12-10=2$	0	1.2
7	14	2	0	1.17
8	16	2	0	1.14

$y = 2x^2$
 $y=2(\quad)^2$

x	y	FD	SD	y-ratio
0	0			
1	2	2		undefined
2	8	6	4	4
3	18	10	4	2.25
4	32	$32-18=14$	4	$\frac{32}{18}=1.78$
5	50	$50-32=18$	4	$\frac{50}{32}=1.56$
6	72	22	4	1.44
7	98	26	4	1.36
8	128	30	4	1.31

$y = 2^x$
 $y=2(\quad)$

x	y	FD	SD	y-ratio
0	1			
1	2	1		2
2	4	2	1	2
3	8	4	2	2
4	16	8	4	$\frac{16}{8}=2$
5	32	16	8	$\frac{32}{16}=2$
6	64	32	16	$\frac{64}{32}=2$
7	128	64	32	$\frac{128}{64}=2$
8	256	128	64	$\frac{256}{128}=2$

2. Classify each relation above as either quadratic, linear, exponential, or "unknown". Explain.

👉 **linear**
 👉 first differences are constant

👉 **quadratic**
 👉 second differences are constant

👉 **exponential**
 👉 y-ratios are constant

3. Determine the y-coordinates for each relation when $x = 0.5$ and when $x = 1.5$ too!

Include these below:

$y = 2x$

x	y
0.5	1
1.5	3

$y = 2x^2$

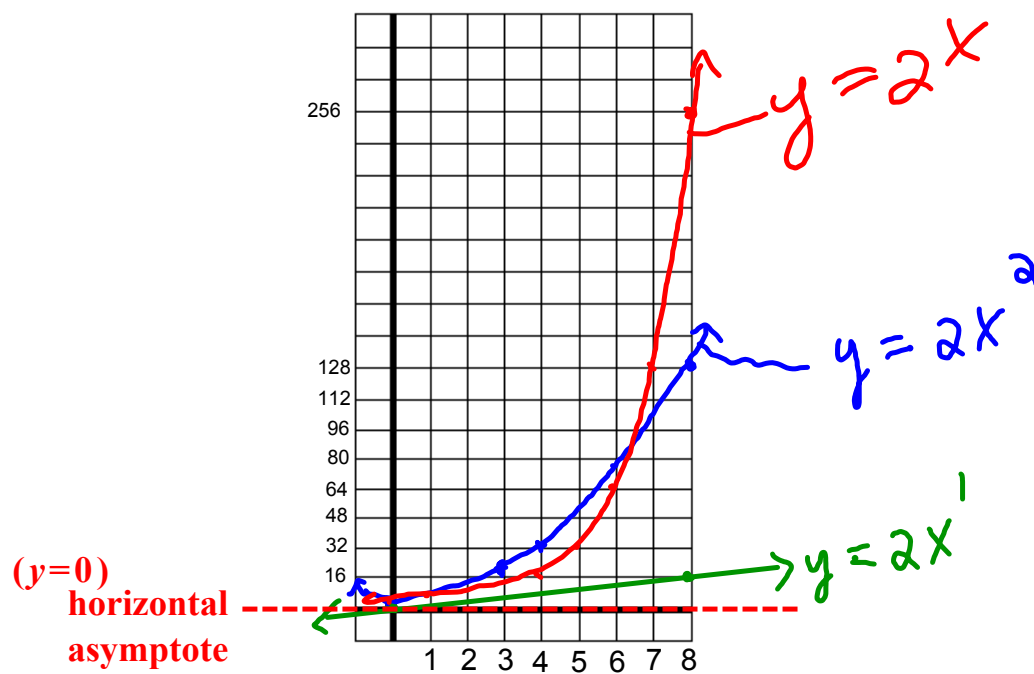
x	y
0.5	0.5
1.5	4.5

$y = 2^x$

x	y
0.5	1.41
1.5	2.82

4. On the grid below, graph all three relations using the table of values from Question 1 and Question 3! Label them too. Use pencil only.

Use the scales: **x-axis:** **1 block = 1 unit**
 y-axis: **1 block = 16 units**



CONCLUSIONS:

1. Which relation represents the slowest growth? Why? Which represents the fastest growth? Why?

👉 slowest growth: $y=2x$

👉 fastest growth: $y=2^x$

EXAMPLE

A vase that cost \$800 today is expected to increase in value by 7% each year for 5 years. Without graphing, is the growth linear, quadratic, exponential, or “unknown”? Explain.

1 👉 $800 \times 1.07 = 856$

2 👉 $856 \times 1.07 = 915.92$

Year x	Value y	
0	800	
1	856	FD 56
2	915.92	59.92
3	978.03	64.11
4	1048.63	
5	1122.03	

SD 3.92, 4.19

y-ratios

$$\frac{856}{800} = 1.07$$

$$\frac{915.92}{856} = 1.07$$

the y ratios are constant
the value of the vase is
increasing **exponentially**

This homework is also on the bottom of the back of the handout.

Entertainment: *Relations*

NO GRAPHING IS REQUIRED.

1. Do: p. 377 # 2
2. For each relationship, without graphing, is it linear, quadratic, exponential, or “unknown”?
Hint: for help use the **EXAMPLE** above.
 - a) James stacks cans for a grocery store display. The top row has 1 can, the second row has 2 cans, the third row has 3 cans, etc.....
 - b) A soccer ball is kicked. At 1 sec., its height is 20.6m. At 2 sec., its height is 30.4 m. At 3 sec., its height is again at 30.4m. At 4 sec., the height is 20.6m. At 5 sec., the height is 1m etc.....
 - c) A \$600 investment is worth \$618 after 1 year, \$636 after 2 years, \$654 after 3 years, \$672 after 4 years, etc.....