7.4 Exponential Relations

A Exponential Relation

An Exponential relation is defined by:

$$y = b^x$$

where:

- ✓ x is the independent variable and is part of the exponent
- ✓ b is called the base
- ✓ y is the dependant variable

Example 1. Identify the exponential relations.

a) $y = \left(\frac{1}{2}\right)^x$ b) $y = -2x + 3$ c) $y = 3^x$ d) $y = (x - 1)(x + 2)$ e) $y = 0.7^x$

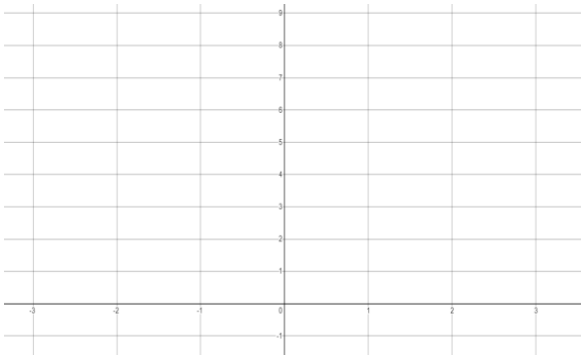
B Investigate $y = b^x$ with $b > 1$

Example 2. Use the exponential relation $y = 2^x$ and make a table of values. Compute the first differences and the ratios. Make a scatter plot. Join the point and sketch the graph. Draw conclusions.

Table of Values

x	$y = 2^x$	First Differences	Ratio
-3			
-2			
-1			
0			
1			
2			
3			

Scatter Plot



Conclusions about the exponential relation $y = 2^x$:

x-intercepts:
y-intercept:
Increasing or Decreasing:
Common Ratio and Base:

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Example 3. Use Desmos and graph the exponential relation $y = 2^x$.

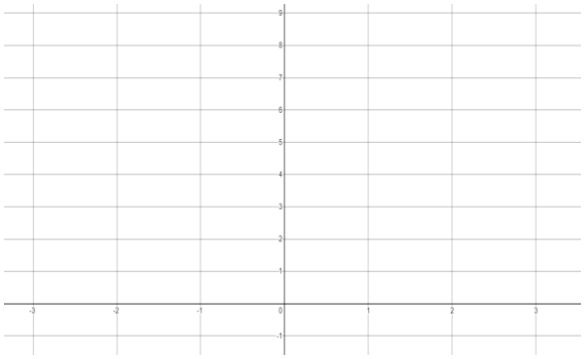
D Investigate $y = b^x$ with $b < 1$

Example 4. Use the exponential relation $y = 0.5^x$ and make a table of values. Compute the first differences and the ratios. Make a scatter plot. Join the point and sketch the graph. Draw conclusions.

Table of Values

x	$y = 0.5^x$	First Differences	Ratio
-3			
-2			
-1			
0			
1			
2			
3			

Scatter Plot



x-intercepts:
y-intercept:
Increasing or Decreasing:
Common Ratio and Base:

Example 5. Use Desmos and graph on the same grid the following exponential relations

a) $y = 2^x$

b) $y = 4^x$

c) $y = 10^x$

Conclusion:

Example 6. Use Desmos and graph on the same grid the following exponential relations

a) $y = 0.5^x$

b) $y = 0.25^x$

c) $y = 0.1^x$

Conclusion:

Notes: Textbook Pages 382-389
Homework: Textbook Pages 390 # 1, 2, 4a, 5a, 6, 8