Unit 4 Review – Exponential Functions

Exponent Laws

Product $x^a \bullet x^b =$ e.g., $3^7 \bullet a^4 \bullet 3^2 \bullet a$	**Quotient** $\frac{x^a}{x^b} =$ e.g., $\frac{5^6 a^4 b^6}{5a^2 b^6 c}$
Power of a Power $(x^a)^b =$ e.g., $(2a^2b^3)^4$	**Negative** $x^{-a} =$ e.g., $\left(\frac{2}{5}\right)^{-2}$
Zero $x^0 =$, $x \neq$ e.g., $(-5)^0$ e.g., -4^0	**Rational** $x^{\frac{a}{b}} =$ e.g., $(32)^{\frac{2}{5}}$

Graphing and Transformations

$y = ab^x$

An exponential function has a constant **ratio** between the y values.

If $|b| > 1$, the function _____. If $0 < |b| < 1$, the function _____ .

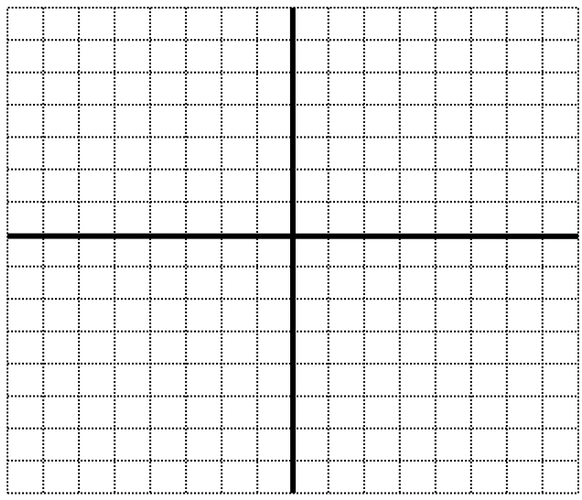
To graph an exponential function:

1. Graph the asymptote.
2. Plot the anchor points: (0, 1) and (1, b).
3. Draw the graph.

To graph transformations of an exponential function:

1. Describe the transformations. Write the mapping.
2. Apply the mapping to the original asymptote and to the original anchor points. Draw the transformed function.

Graph $f(x) = 3(2)^{x-1} + 2$



Modelling Exponential Phenomena

$$y = a \bullet b^x$$

When defining variables, **let x represent the number of times the change occurs**.

e.g., The value of a car depreciates by 8 percent every 6 months. What would the value of a $19 500 car be after 2 years?

Solving Exponential Equations

To solve:

1. Make the bases the same (if base = base, then exponent = exponent)
2. Use logarithms: if $b^x = y$ then $x = \dfrac{\log y}{\log b}$

e.g., Solve for x.

$2^x = (16^{x-1})(2^x)$