## Topic 6.1 Exponential and Logarithmic Function

Essential Question:
How do graphs and equations reveal key features of exponential growth?

## Explore \& Reason

Complete online.

CONCEPT Summary: Key Features of Exponential Function

## Exponential Growth

Exponential Decay

## GRAPHS <br> EQUATIONS

KEY FEATURES

MODELS
Growth: $A(t)=a(1+r)^{t}$


Decay factor: $1-r$

$$
y=a \cdot b^{x}, \text { for } 0<b<1
$$

Domain: All real numbers
Range: $\{y \mid y \geq 0\}$
Intercepts: $(0, a)$
Asymptote: $x$-axis

$$
\begin{gathered}
\text { As } x \rightarrow-\infty, y \rightarrow \infty \\
\text { As } x \rightarrow \infty, y \rightarrow 0
\end{gathered}
$$

Decay: $A(t)=a(1-r)^{t}$

Q: Consider the function $y=500(0.86)^{x}$. How can you find the rate of decay?

Notes:

## Examples \& Questions <br> Examples 1

Q: Consider the functions $f(x)=2^{x}$ and $g(x)=5\left(\frac{1}{2}\right)^{\times}$. What information tells you
whether the functions are increasing or decreasing?

## Examples 2

Q: The point $(1,3)$ is on $f(x)$. How does a reflection tell you what point will be on $g(x)$ ?
Q: How does a translation of $f(x)-4$ tell the new point on $h(x)$ ?

## Examples 3

Q: What is the relationship between the numbers om the left side of the graphic and the expressions on the right side of the graphic?
Q : Why is the growth factor 1.013 rather than 0.013 ?
Examples 4
Q: Why is $0<x<10$ a reasonable domain?
Q : The value of another car can be modeled by $y=31 \cdot 0.77^{x}$. How does the value of this car compare to that of the value of the car given in the example?

Examples 5
Q: Why is the slope of the line containing two points on the graph of an exponential function
considered the average rate of change?
Q: How else could you compare the two functions besides comparing their averate rate of change over the 5-year period?

Practice and Problem Solving
Complete MathXL for School: Practice and Problem Solving (online)
Complete MathXL for School: Enrichment (online)

Challenge: \#26 - key will be posted in Power School Learning.

Lesson Quiz 6.1

