



Essential Question:

WHAT ARE THE IMPORTANT PROPERTIES OF EXPONENTIAL FUNCTIONS?

Questions:

$$\begin{aligned} 2^0 &= 1 \\ 3^0 &= 1 \\ 4^0 &= 1 \\ 1547^0 &= 1 \end{aligned}$$

Notes: KEY FEATURES OF $f(x) = a^x, a \in \mathbb{R}^+, a \neq 1$

Domain: \mathbb{R}

Range: \mathbb{R}^+

horizontal asymptote: $y = 0$ (x-axis)

INCREASING FUNCTION

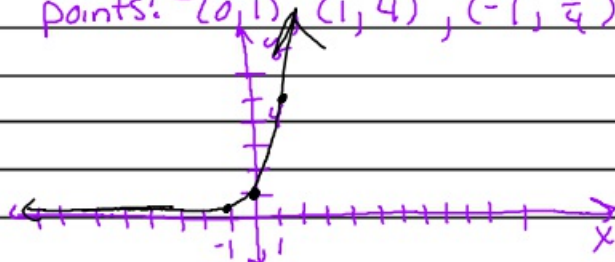
y-intercept: $(0, 1)$

$$\left(-1, \frac{1}{a}\right) \quad 2^{-1} = \frac{1}{2} \quad 3^{-1} = \frac{1}{3}$$

$(1, a)$

EX) GRAPH $y = 4^x$

points: $(0, 1), (1, 4), (-1, \frac{1}{4})$



p. III COMPOUND INTEREST

$$A = C \left(1 + \frac{r}{n}\right)^{nt}$$

A = Capital plus interest

C = Capital

r = interest rate (in decimal)

n = # of compoundings in a year

t = # of years

$$C = 1, r = 100\%, n = 1, t = 1$$

a. $A = 1 \left(1 + \frac{1}{1}\right)^{1 \cdot 1} = 1 \cdot (2)^1 = 2$

b. compounded quarterly: $n = 4$

$$1 = A = 1 \left(1 + \frac{1}{4}\right)^{4 \cdot 1} = 2.4414$$

2 Copy and complete the table.

Compounding	Calculation	Final amount (write all figures on calculator)
Yearly	$\left(1 + \frac{1}{1}\right)^1$	2
Half-Yearly	$\left(1 + \frac{1}{2}\right)^2$	2.25
Quarterly	$\left(1 + \frac{1}{4}\right)^4$	2.44140625
Monthly	$\left(1 + \frac{1}{12}\right)^{12}$	2.61303
Weekly	$\left(1 + \frac{1}{52}\right)^{52}$	2.692596
Daily	$\left(1 + \frac{1}{365}\right)^{365}$	2.714567
Hourly	$\left(1 + \frac{1}{8760}\right)^{8760}$	2.718176
Every minute		2.7182
Every second		2.718278

