Lesson 10: Determining the Equation of an Exponential Function

Solve

step 1: isolate b by performing opposite operations to both sides

$$\frac{6.4}{0.4} = \frac{0.4 \cdot b^4}{0.4}$$

$$\sqrt[4]{16} = \sqrt[4]{b^4}$$

$$2 = b$$

$\boxed{4}$ $\boxed{x\sqrt{\ }}$ $\boxed{16}$

b e d m a s

solving

Solve $120 = 960b^3$

Determining the Equation of an Exponential Function

Step i. identify which function

$f(x) = ab^x$

step ii find value of a (graph → y-int)

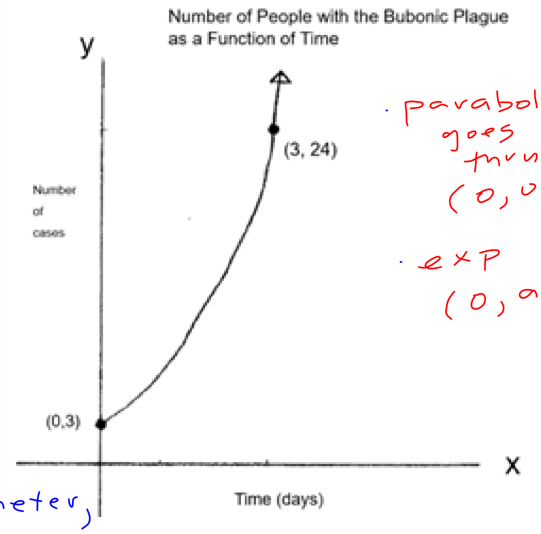
(TOV → the y, when $x = 0$)

$a = 3$

step iii. sub a into equation

$f(x) = ab^x$

$y = 3b^x$



· parabola goes thru (0,0)

· exp (0, a)

Step iv. To find last parameter, sub in point and solve $(\underset{x}{3}, \underset{y}{24})$

$y = 3b^x$

$\frac{24}{3} = \frac{\cancel{3}b^3}{\cancel{3}}$

solve! o.o.

$\sqrt[3]{8} = \sqrt[3]{b^3}$

$2 = b$

Step v. State final equation and use it

$y = ab^x$ $a = 3$, $b = 2$

$y = 3 \cdot 2^x$

$f(x) = 3 \cdot 2^x$ find $f(30)$

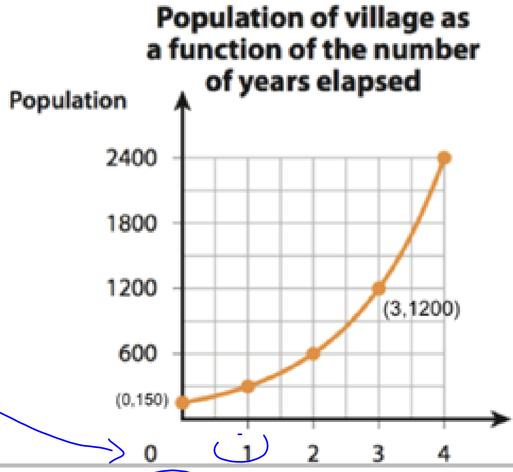
$f(30) = 3 \cdot 2^{30}$ 3×2 [^] 30

$f(30) = 3$ billion

In one month, there will be 3 billion $\bar{w}$ the black plague.

Question 1: In 1995, a data scientist started to observe the population of a village that was experiencing exponential growth. At the beginning there were 150 inhabitants, and three years later the population had grown to 1200. If this population-growth trend continues, how many people will there be in 2025? − initial year

elapsed time



1995

1996

1997

Example: Unlike the resale value of most major purchases, the value of a piece of art can grow exponentially. The table below describes the value of one artwork as a function of time in years. How much will the piece of art be worth in 24 years?

Value of an artwork as a function of time

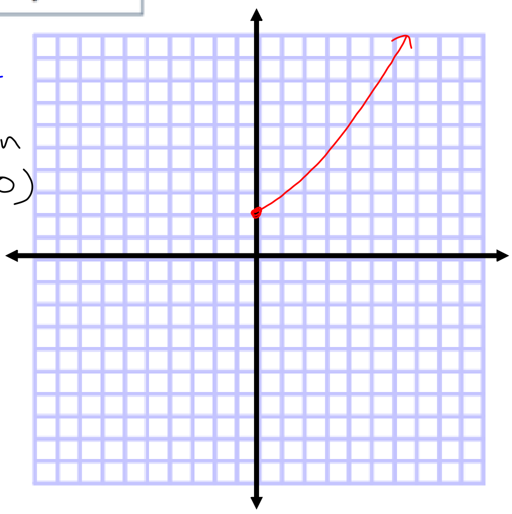
x	Time (a)	0	10	24
y	Value ($)	500	950	?

$= a$

if $f(x) = ab^x$

then $f(x) = 500b^x$

find b by subbing in $(10, 950)$
x y



Hmwk:

pg 94 #7 pg 100 #1

pg 101 #2 pg 104 #2 a)

maybe (b), c))

pg 108 #9