Precalculus Honors

Exponentials

Toolkit

Name: ______________________

Date: ______________________

Period:_____

G___

Compound Interest

A = Final Amount

P = Initial Principal Balance

r = Interest Rate

n = Number of times interest is applied per time period

t = number of time periods elapsed

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

Romelle has saved $4000 and plans to invest it in an account earning 5% interest, compounded quarterly. Assuming no further deposits, how much money will Romelle have in the savings account after *t* years?

I. Why is an exponential model appropriate?

Since we multiply the balance each time by the same number an exponential model is appropriate.

II. Write an equation that models the situation

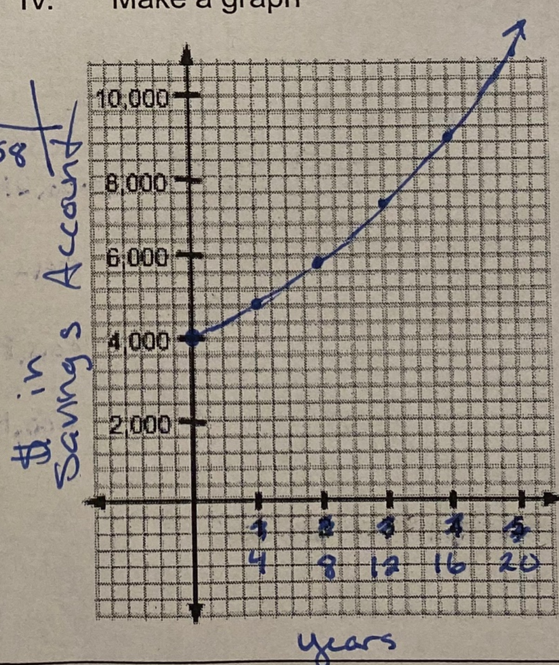
$f(t) = 4000\left(1 + \frac{.05}{4}\right)^{4t} \rightarrow f(t) = 4000(1.0125)^{4t}$

III. Make a table

time years	0	4	8	12	16
$	4000	4880	5953	7261	8858

20
10 806

IV. Make a graph



Standard Exponential Functions

a = Initial Amount

$$y = ab^{(x-h)} + k$$

b = multiplier or constant ratio

h = horizontal shift

k = vertical shift

*** Exponential graphs can be written without the horizontal shift and not all exponential graphs have a vertical shift.**

A scientist is growing bacteria, starting with a culture of 5 bacteria. Bacteria "grow" by multiplying. After 2 hours there are 14 bacteria. How many bacteria will be present after *t* hours?

I. Why is an exponential model appropriate?

since the bacteria is multiplying each time an exponential model is appropriate

II. Write an equation that models the situation.

$f(t) = a \cdot b^{t}$

$f(t) = 5 \cdot b^{t}$

$14 = 5 \cdot b^{2}$

$\frac{14}{5} = b^{2}$

$1.67 \approx b$

$f(t) = 5(1.67)^{t}$

III. Make a table

t hours	0	2	4	6	8	10
f(x) # of bacteria	5	14	39	108	302	844

IV. Make a graph