Lesson 43 MR12

Aim: How do we apply the exponential function?

HW: Page 312-313 # 12,14,18a,b,19, 20, 23 Page 308 # 23,29

Do Now:
John bought an antique for $1000. The value of the antique has a 10% fixed increasing rate annually. Find the value o the antique after
a) 1 year b) 2 years c) 5 years d) 10 years

Answers:

$A = 1000(1 + 0.1)^5$

$= 1000(1.61051) = 1610.51$

$A = 1000(1 + 0.1)^{10} = 1000(1.1)^{10}$

$= 1000(2.5937) = 2593.7$

Jan 5-9:07 AM

Exponential Growth:

$A = A_o(1 + r)^t$

A is the amount after certain number o years
A_o is the initial amount
r is the rate
t is the number of years

Jan 5-9:10 AM

Enrique won $10,000 and decided to use it as a “vacation fund.” each summer, he withdraws an amount of money that reduces the value of the fund by 7.5% from the previous summer. How much will the fund be worth after the tenth withdrawal?

This problem is **decay** situation

Use the formula $A = A_0(1 + r)^t$
with A_0 = 10.000, r = – 0.075 and t = 10.

$A = 10{,}000(1 – 0.075)^{10} = 10{,}000(0.925)^{10}$
= **4,585.82**

Jan 5-9:15 AM

To find the **compound interest** , we us n is number of times compounded per year. t is the number of years.

$$A = A_0(1 + \frac{r}{n})^{nt}$$

Marissa has $2500 to deposit into a bank account. The interest rate is 4%. What is the difference if the money is compounded annually, monthly, or quarterly for 6 years?

Compounded Annually
$2500(1+.04)^6$
$2500(1.04)^6$
2500(1.2653)
3163.25

Monthly
$2500(1 + .04/12)^{6(12)}$
$2500(1+.0033)^{72}$
$2500(1.0033)^{72}$
2500(1.2677)
3169.25

Quarterly
$2500(1+ .04/4)^{6(4)}$
$2500(1 + .01)^{24}$
$2500(1.01)^{24}$
2500(1.2697)
3174.25

Continuously
$A = Pe^{rt}$ or $A = A_oe^{rt}$
e = 2.71
$2500e^{.04(6)}$
$2500e^{(.24)}$
2500(1.2712)
3178

Jan 5-9:19 AM

In a state park, the deer population was estimated to be 2000 and increasing continuously at a rate of 4% per year. If th increase continues at that rate, what is the expected deer population in 10 years?

Since change takes place continuously

Use the formula $A = A_o e^{rt}$.

Let $A_o = 2000$,

$r = 0.04$, and $t = 10$.

$A = 2000e^{(0.04)(10)} = 2000e^{0.4}$

$A = 2984$

Jan 5-9:24 AM

The decay constant of radium is – 0.0004 per year.
How many grams will remain of a 50-gram sample of radium after 20 years?

Change is taking place continuously.

Use the formula $A = A_o e^{rt}$.

Ao =

r =

t =

e =

Jan 5-9:30 AM

Jan 5-1:44 PM