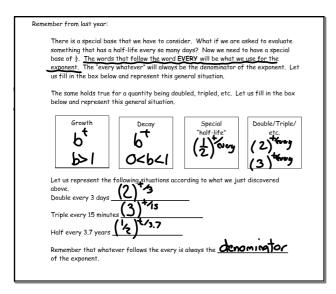


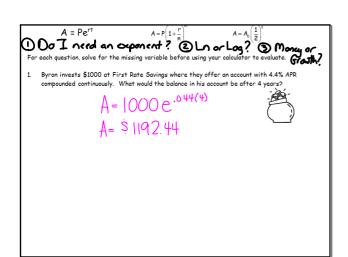
Word Problem Mixture
Classwork/Homework  $A = Pe^{rt}$   $A = P\left(1 + \frac{r}{n}\right)^{n}$   $A = A_{0}\left(\frac{1}{2}\right)^{\frac{1}{2}}$   $A = A_{0}\left(\frac{1}{2}\right)^{\frac{1}{2}}$ 

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Example: If a population of honeybees doubles every 5 years, how many years to the nearest tenth of a year will it take the population to increase by 10 times the original amount?  $10: 1(2)^{-1/5}$   $109: 0: \pm 1092$   $\pm .5(\frac{109:10}{109:2}) = 16.6 \text{ years}$ 

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2. When Angelina was born, her grandparents deposited \$3000 into a college savings account pay 4% interest compounded continuously.

a. Assuming there are no deposits or withdrawals from the account, what will the balance be after 10 years?  $A = 30000e^{-.04(10)}$ b. How long will it take the balance to reach at least \$10,000?  $1000 = 3000e^{-.044}$   $1000 = 3000e^{-.044}$   $1000 = 10000e^{-.044}$ c. If her grandparents want her to have \$10000 after 18 years, how much would they need to invest?  $10000 = Pe^{18(.04)}$   $P = 10000e^{-.044}$   $P = 10000e^{-.044}$   $P = 10000e^{-.044}$   $P = 10000e^{-.044}$ 

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If interest is compounded quarterly, what annual rate must you receive if your investment of \$1500 is to grow to \$2100 in six years? (round to the nearest  $2|00 = |500(1 + \frac{r}{4})^{4(6)}$   $|4 = (1 + \frac{r}{4})^{24/80} \rightarrow 24/14 = (14)^{1/24} - 1 = \frac{r}{4}$ 

$$| \frac{1}{|A|} = \frac{$$

Mrs. Chapman invests \$8500 in a retirement account with a fixed annual interest rate of 7% compounded monthly. How long will it take for the balance to reach \$70000? (round to the nearest month)

(round to the nearest month)
$$70000 = 8500 \left(1 + \frac{07}{12}\right)^{12t}$$

$$\log \frac{140}{17} = 12t \log \left(1 + \frac{07}{12}\right)$$

$$t = \frac{\log \frac{140}{17}}{12\log(1 + \frac{07}{12})}$$

$$t = 30 \text{ years } \in 3 \text{ months}$$

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What is the half-life of a radioactive isotope if a 500.0 gram sample decays to 62.5 grams in 24.3 hours?  $(2.5 = 500 \left(\frac{1}{2}\right)^{24.3})_h^{1}$ h=8.1 hours

A super-deadly strain of bacteria is causing the zombie population to double every 2 days. Currently, there are 25 zombies. After how many days will there be 25,600  $\,$ days. Cur zombies?

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of named to the same of the number of days since 10 modeled using the equation students had the fluction 50 = 10(2) log 5 = tog(2)  $t = \frac{\log(5)}{\log(2)} \cdot 6 \approx 13.93 \approx 14 \text{ days}$ 

8. Mr. Cuthbert deposits \$5000 into an account paying 4.3% interest compounded semi-annually. How long until he has \$8000 in the account? 8000 = 5000 (1+ 043)

$$\log(1.6) = 2t \log(1.0125)$$

$$t = \frac{\log(1.6)}{2\log(1.0125)}$$

$$t \approx 11 \text{ yrs}$$

Nov 14-3:20 PM Nov 14-3:20 PM 9. Carbon-14 has been used to date the La Brea Tar Pits by testing remains of Saber Tooth Tigers. Carbon-14 has a half-life of 5,730 years. Scientifically it is assumed that the initial mass of Carbon-14 abundant in a saber tooth femur was 1 microgram. If the measurements indicate that the current mass of Carbon-14 in the femur is approximately 0.09 micrograms, how many years ago did the saber tooth die? (round to the nearest 10 years)

rest 10 years)
$$.09 = 1 \left(\frac{1}{2}\right)^{4/5730}$$

$$log .09 = \frac{t}{5730} log (.5)$$

$$t = \frac{5730log .09}{(log .5)}$$

$$t_{7} log 10 years ago$$

10. Mrs. Phelps has \$4000 she is going to invest in an account that compounds continuously. She plans to keep her money in the account for 15 years and would like it to be worth \$7500 when she takes it out. What interest rate will she need to receive? (round to the nearest tenth)

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