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Date \_\_\_\_\_  
Algebra II

## *Irregular Time (Half Life)*

1. The half-life of mendelevium-258 is 51.5 days. Write an equation for the amount of mendelevium-258 remaining from an initial amount of 4000 grams after  $d$  days. To the *nearest hundredth of a gram*, how much mendelevium-258 will remain after 12 days?
2. The amount of ants in a colony doubles every 8 days. If there are initially 275 ants, write an equation for  $a(t)$ , the amount of ants in the colony after  $t$  days. How many ants, to the nearest ant, will be in the colony after 30 days?
3. Phil is trying to get himself back into shape and wants to ease his way back into distance running. He will start by running 2 miles each day but every four days, he will increase his distance by 60%. Create an equation to represent how many  $m$  miles Phil will be running after  $d$  days. How many miles will Phil be running after 10 days rounded to the *nearest mile*?
4. The half life of an element is 27 hours. If there were initially 4.2 kg of the substance, how much will remain after 2 days? Round your answer to the nearest hundredth of a kg.

5. Jabba went to the movies on Friday night and bought a large popcorn. Every 20 minutes, Jabba eats 40% of the remaining amount of popcorn in his bucket. If there were 967 pieces of popcorn initially in Jabba's bucket, write an equation for  $a(t)$ , the amount of popcorn left in Jabba's bucket after  $t$  minutes. How many pieces of popcorn, to the *nearest piece of popcorn*, will be left an hour and a half into the movie?

6. The amount of views of a YouTube video triples every 5 days. If it currently has 1120 views, how many full views will the video have two weeks from now?

7. A payday loan company makes loans between \$100 and \$1000 available to customers. Every 14 days, customers are charged 30% interest with compounding. In 2013, Remi took out a \$300 payday loan. Which expression can be used to calculate the amount she would owe, in dollars, after one year if she did not make payments?

- 1)  $300(.30)^{\frac{14}{365}}$       2)  $300(1.30)^{\frac{14}{365}}$       3)  $300(.30)^{\frac{365}{14}}$       4)  $300(1.30)^{\frac{365}{14}}$

8. Jay borrowed \$50,000 from Aaron and they came to an agreement regarding how the interest will be paid. Every week, the loan will accumulate 2% interest. If Jay repays the loan after 21 days, how much money will he have to repay Aaron rounded to the *nearest cent*?