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Algebra II

## ***Modeling Exponential Functions Review Sheet***

If  $t$  represents years, find the yearly rate of increase/decrease for the following functions.  
Round to the nearest tenth of a percent.

1.  $A = 38,000(0.987)^{12t}$       2.  $A = 16,000(0.887)^{8.4t}$

3.  $A = 9,200(1.985)^{\frac{t}{2}}$       4.  $A = 9,324(1.562)^{\frac{t}{5}}$

5. A study of black bears in the Adirondacks reveals that their population can be represented by the function  $P(t) = 3500(1.025)^t$ , where  $t$  is the number of years since the study began. Which function is correctly rewritten to reveal the monthly growth rate of the black bear population?

- 1)  $P(t) = 3500(1.00206)^{12t}$       3)  $P(t) = 3500(1.34489)^{12t}$   
2)  $P(t) = 3500(1.00206)^{\frac{t}{12}}$       4)  $P(t) = 3500(1.34489)^{\frac{t}{12}}$

6. Driven by conservation efforts in Asia, the global population of tigers in the wild has shown a significant increase in the past few years. In 2010 there were estimated to be 3,200 tigers in the wild and that number has grown by approximately 3.3% per year since. Which formula can be used to determine,  $T$ , the number of wild tigers,  $d$  days since 2010?

- 1)  $T(t) = 3,200(1.033^{\frac{1}{365}})^d$       3)  $T(t) = 3,200(1.033^{365})^{\frac{365}{d}}$   
2)  $T(t) = 3,200(1.033^{\frac{1}{365}})^{365d}$       4)  $T(t) = 3,200(1.033^{365})^d$

7. The function  $A = 3,600(1.025)^t$  represents the value of a bank account after  $t$  years. Which of the following statements is *false*?

- 1) The initial investment of the bank account was \$3,600.  
2) The annual interest rate of the bank account is 2.5%.  
3) The value of the account after 5 years is \$4073.07.  
4) It will take 12 years for the value of the account to double.

8. The function  $v(t) = 40,000(0.887)^t$  represents the value of a 2020 Subaru Ascent after  $t$  years. Which of the following statements is *false*?
- 1) The initial value of the car was \$40,000.
  - 2) The value of the car is decreasing by 11.3% each year.
  - 3) The car is worth \$15,324.18 after 5 years.
  - 4) The decreased \$3,556.20 from years 2 to 3.
9. Joe Manana just opened a bank account with a \$5000 initial balance. If the interest is compounded quarterly at a rate of 2.8%, how long would it take for his money to double? Round your answer to the *nearest tenth of a year*.
10. The half-life of substance X is 12.4 minutes. How much of a 300mg sample of substance X will remain after 1 hour to the *nearest milligram*?
11. A bank account opened up 3 years ago with an initial balance of \$12000 now has a balance of \$12824. Find the annual growth rate, to the *nearest tenth of a percent*.
12. How much money is in a bank account opened 6.5 years ago with \$2155.67 that is compounded weekly with an interest rate of 5.16% rounded to the *nearest cent*?

13. The table below shows three different investment options in which Lauren can invest \$8,000.

Option	Annual Interest Rate	Frequency of Compounding
A	6.45%	Annually
B	6.43%	Continuously
C	6.44%	Weekly

Which option will allow Lauren to earn the most money over the course of a four-year period? Justify your answer.

14. Jeff opened a bank account with a principal balance of \$3000. Interest is compounded continuously at a rate of 1.3%. After how many years, to the *nearest tenth of a year*, will it take for Jeff's account to increase by 50%?

15. The principal value of a loan is \$424,100. If there is \$110,000 remaining on the loan after 19 years, what was the annual rate of decrease to the *nearest tenth of a percent*?

16. Jay borrowed \$15,000 from Aaron and they came to an agreement regarding how the interest will be paid. Every five days, the loan will accumulate 2.5% interest. To the *nearest day*, after how many days will Jay owe \$2500?