

1. Find the pH level to the nearest tenth of a liquid if its  $[H^+]$  is about  $2.8 \times 10^{-8}$
- $$\left( H^+ = \left( \frac{1}{10} \right)^{\text{pH}} \right)$$
2. The half-life of carbon-14 is 5700 years. Find the age of a sample at which 25% of the radioactive nuclei originally present have decayed.
- [A] 2366 years                      [B] 3366 years  
[C] 2916 years                      [D] 2466 years
3. A certain radioactive material decays according to the law  $A = A_0 e^{-0.021t}$ , where  $A_0$  is the initial amount present and  $A$  is the amount present in  $t$  years. What is the half-life of this material? Round the answer to two decimal places.
- [A] 66.01 years                      [B] 95.24 years  
[C] 33.01 years  
[D] impossible to determine without knowing  $A_0$
4. Which equation can be used to find continuously compounded interest?
- [A]  $P = (1 + e)^{rt}$                       [B]  $A = Pe^{rt}$   
[C]  $A = Pr^{et}$                       [D]  $P = \left( 1 + \frac{1}{e} \right)^{rt}$
5. If \$7000 is invested at a rate of 11% compounded continuously, find the balance in the account after 2 years. Use the formula  $P = P_0 e^{kt}$ .
- [A] \$51723.39                      [B] \$8624.70  
[C] \$9736.78                      [D] \$8722.54
6. What amount (to the nearest cent) will an account have after 10 years if \$50 is invested at 7.5% interest compounded continuously?
- [A] \$104.41                      [B] \$103.05  
[C] \$105.85                      [D] \$105.12
7. What principal invested at 11% compounded continuously for 6 years will yield \$1210? Round the answer to two decimal places.
8. The number of bacteria present in a culture after  $t$  minutes is given as  $B = 10e^{kt}$ . If there are 3527 bacteria present after 3 minutes, find  $k$ .
- [A] 17.597                      [B] 1.943  
[C] 1.955                      [D] 5.866
9. The number of bacteria present in a culture after  $t$  minutes is given as  $B = 100e^{kt}$ . If there are 9790 bacteria present after 7 minutes, find  $k$ .
- [A] 32.088                      [B] 0.764  
[C] 0.655                      [D] 4.584
10. Newton's Law of Cooling is given by the function,  $T(t) = T_r + (T_i - T_r)e^{kt}$ , where  $T(t)$  is the temperature of a heated substance  $t$  minutes after it has been removed from a heat (or cooling) source.  $T_i$  is the substance's initial temperature,  $k$  is a constant for that substance, and  $T_r$  is room temperature.
- The initial temperature of a roast beef is  $240^\circ$  F, room temperature is  $70^\circ$ , and  $k = -0.041$ . How long will it take to cool to within one degree of room temperature?

Algebra II Practice F.LE.A.4: Exponential Growth and Decay

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- [1] 7.6 \_\_\_\_\_
- [2] A \_\_\_\_\_
- [3] C \_\_\_\_\_
- [4] B \_\_\_\_\_
- [5] D \_\_\_\_\_
- [6] C \_\_\_\_\_
- [7] \$625.39 \_\_\_\_\_
- [8] C \_\_\_\_\_
- [9] C \_\_\_\_\_
- [10]  $t = 125$  min \_\_\_\_\_