

Name _____
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Date _____
Algebra II

Equivalent Exponents Forms

1. Iridium-192 is an isotope of iridium and has a half-life of 73.83 days. If a laboratory experiment begins with 100 grams of Iridium-192, the number of grams, A , of Iridium-192

present after t days would be $A = 100\left(\frac{1}{2}\right)^{\frac{t}{73.83}}$. Which equation approximates the amount of

Iridium-192 present after t days?

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| 1) $A = 100\left(\frac{73.83}{2}\right)^t$ | 3) $A = 100(0.990656)^t$ |
| 2) $A = 100\left(\frac{1}{147.66}\right)^t$ | 4) $A = 100(0.116381)^t$ |

2. A certain pain reliever is taken in 220 mg dosages and has a half-life of 12 hours. The

function $A = 220\left(\frac{1}{2}\right)^{\frac{t}{12}}$ can be used to model this situation, where A is the amount of pain

reliever in milligrams remaining in the body after t hours. According to this function, which statement is true?

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| 1) Every hour, the amount of pain reliever remaining is cut in half. | 3) In 24 hours, there is no pain reliever remaining in the body. |
| 2) In 12 hours, there is no pain reliever remaining in the body. | 4) In 12 hours, 110 mg of pain reliever is remaining. |

3. An equation to represent the value of a car after t months of ownership is $v = 32,000(0.81)^{\frac{t}{12}}$. Which statement is *not* correct?

- 1) The car lost approximately 19% of its value each month.
- 2) The car maintained approximately 98% of its value each month.
- 3) The value of the car when it was purchased was \$32,000.
- 4) The value of the car 1 year after it was purchased was \$25,920.

4. The value of an investment account, $v(t)$, can be modeled by the equation $v(t) = 500(1.15)^{3.2t}$ after t years. Which of the following statements must be true?

- 1) The account is increasing approximately 15% each year.
- 2) The account is increasing approximately 56% each year
- 3) There will be \$1216.80 in the account after two years
- 4) It will take 3.68 years for the account to double

5. The population, $p(t)$, of a small county in Western New York has grown according to the formula $p(t) = 6000(1.392)^{1.2t}$ after t years. When re-written in the form $p(t) = 6000e^{rt}$, what is the value of r rounded to the nearest thousandth?

6. The value of an investment account, $v(t)$, can be modeled by the formula $v(t) = 10000(.875)^{1.04t}$ after t years. When written in its equivalent form, $v(t) = 10000e^{rt}$, what would be the value of r rounded to the nearest tenth of a percent? Interpret the meaning of this value in the context of the problem.

7. The half-life of iodine-131 is 8 days. The percent of the isotope left in the body d days after being introduced is $I = 100\left(\frac{1}{2}\right)^{\frac{d}{8}}$. When this equation is written in terms of the number e , the base of the natural logarithm, it is equivalent to $I = 100e^{kd}$. What is the approximate value of the constant, k ?

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| 1) -0.087 | 3) -11.542 |
| 2) 0.087 | 4) 11.542 |

8. According to a pricing website, Indroid phones lose 58% of their cash value over 1.5 years. Which expression can be used to estimate the value of a \$300 Indroid phone in 1.5 years?

- 1) $300e^{-0.87}$
- 2) $300e^{-0.63}$
- 3) $300e^{-0.58}$
- 4) $300e^{-0.42}$