A.SSE.B.3: Modeling Exponential Functions 2

1 A study of the annual population of the red-winged blackbird in Ft. Mill, South Carolina, shows the population, $B(t)$, can be represented by the function $B(t) = 750(1.16)^t$, where the t represents the number of years since the study began. In terms of the monthly rate of growth, the population of red-winged blackbirds can be best approximated by the function

1) $B(t) = 750(1.012)^t$
2) $B(t) = 750(1.012)^{12t}$
3) $B(t) = 750(1.16)^{12t}$
4) $B(t) = 750(1.16)^{\frac{t}{12}}$

2 A student studying public policy created a model for the population of Detroit, where the population decreased 25% over a decade. He used the model $P = 714(0.75)^d$, where P is the population, in thousands, d decades after 2010. Another student, Suzanne, wants to use a model that would predict the population after y years. Suzanne's model is best represented by

1) $P = 714(0.6500)^y$
2) $P = 714(0.8500)^y$
3) $P = 714(0.9716)^y$
4) $P = 714(0.9750)^y$

3 lridium-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?

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

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Answer Section

1 ANS: 2

$B(t) = 750\left(1.16^{\frac{1}{12}}\right)^{12t} \approx 750(1.012)^{12t}$ $B(t) = 750\left(1 + \frac{0.16}{12}\right)^{12t}$ is wrong, because the growth is an annual rate that is not compounded monthly.

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2 ANS: 3

$0.75^{\frac{1}{10}} \approx .9716$

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3 ANS: 3

$\left(\frac{1}{2}\right)^{\frac{1}{73.83}} \approx 0.990656$

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