1. A. Each year, the value of the car is 8% less than the previous year's value, so only $100\% - 8\% = 92\%$ of the value is left after every year. Since the initial value of the car is \$20,000, $20{,}000(0.92)$ dollars is the value of the car after 1 year; after 2 years, $20{,}000(0.92)(0.92) = 20{,}000(0.92)^2$ dollars is the value of the car. Therefore, the value of the car after t years is $f(t) = 20{,}000(0.92)^t$. Choice B is incorrect because it is the amount deducted from the initial value. Choice C and D are incorrect because the initial value and the depreciation rate are being confused.

2. B. For the current population of 650,000 to increase by 5%, it needs to be multiplied by $1 + 0.05 = 1.05$. Since the population increases every 10 years, the expression would be $650{,}000(1.05)^t$, where t represents a 10-year period. After n years, the number of 10-year periods that have passed is $\frac{n}{10}$. Therefore $650{,}000(1.05)^{\frac{n}{10}}$ represents the city's population n years from now. Choice A is incorrect because it is the number of people that the population has increased by. Choice C and D are incorrect because the population only increases once every 10 years, not every year.

3. C. Exponential growth adds more money as the money in the account grows; that is, the same proportion of the current value of the account is added each year. Choice C is the only option that does this; in choice C, every year, the current value of the account is multiplied by 1.025. Choices A, B, and D are incorrect because they add a set amount of money or the same proportion of a set amount of money as the value of the initial savings will never change. These are all examples of linear growth.

4. C. In a linear model, the difference between the number of mice in successive time periods is constant; in an exponential model, the ratio between the number of mice in successive time periods is constant. Looking at the table, $\frac{270}{90} = \frac{90}{30} = \frac{30}{10} = 3$. For each week t that passes, the number of mice is multiplied by 3. Therefore, the function to get the number of mice after t weeks is $f(t) = 10(3^t)$.

   Choice A and B are incorrect because they are linear functions. Choice D is incorrect because the initial value and growth rate are swapped.

5. C. Using the given model, the money made with a 3.5% interest is $500\left(1 + \frac{3.5}{200}\right)^2$ and the money made with a 2% interest is $500\left(1 + \frac{2}{200}\right)^2$. The difference between the two amounts is just $500\left(1 + \frac{3.5}{200}\right)^2 - 500\left(1 + \frac{2}{200}\right)^2$. Choice A, B, and D are incorrect because of misinterpreting the formula or finding a different ratio between the two interest rates instead of the difference.

6. B. The cryptocurrency starts at \$32.00 and its value decreases by a factor of 2 each day for 4 days. Since the value of the cryptocurrency is increasing by a constant ratio, it is exponential decay. Choice A, C, and D are incorrect because they do not describe the data in the table.

7. A. Since the annual interest rate is 5%, we must multiply by $1 + 0.05 = 1.05$ each year to find the total amount Monica owes the bank. Choice B is incorrect because the bank charges 5% more each year, not just 0.05% of the total value. Choice C is incorrect because the bank charges 5% more each year, not 5% less. Choice D is incorrect because the bank does not charge 5 times the total value each year.

8. The correct answer is 5963. Plugging into the equation, Monica would owe the first bank with an interest rate of 5% $\$100{,}000(1.05)^5 = \$127{,}628.156$ (to the nearest tenth of a cent); for the second bank with an interest rate of 3%, Monica would owe $\$100{,}000(1.04)^5 = \$121{,}665.290$ (to the nearest tenth of a cent). Taking the difference between the two we get $127{,}628.156 - 121{,}665.290 = 5963$ (rounded to the nearest dollar). Choices A, C and D are incorrect and result from misinterpretation of the question.

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