Exponential functions II

Name: _____

10

Washington High School randomly selected freshman, sophomore, junior, and senior students for a survey about potential changes to next year's schedule. Of students selected for the survey, $\frac{1}{4}$ were freshmen and $\frac{1}{3}$ were sophomores. Half of the remaining selected students were juniors. If 336 students were selected for the survey, how many were seniors?

A) 240
B) 140
C) 120
D) 70

12

A book was on sale for 40% off its original price. If the sale price of the book was \$18.00, what was the original price of the book? (Assume there is no sales tax.)

A) \$7.20
B) \$10.80
C) \$30.00
D) \$45.00

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A company purchased a machine valued at \$120,000. The value of the machine depreciates by the same amount each year so that after 10 years the value will be \$30,000. Which of the following equations gives the value, v, of the machine, in dollars, t years after it was purchased for $0 \leq t \leq 10$?

A) $v = 30{,}000 - 9{,}000t$
B) $v = 120{,}000 - 9{,}000t$
C) $v = 120{,}000 + 9{,}000t$
D) $v = 120{,}000 - 30{,}000t$

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In 2015 the populations of City X and City Y were equal. From 2010 to 2015, the population of City X increased by 20% and the population of City Y decreased by 10%. If the population of City X was 120,000 in 2010, what was the population of City Y in 2010?

A) 60,000
B) 90,000
C) 160,000
D) 240,000

18

Juan purchased an antique that had a value of \$200 at the time of purchase. Each year, the value of the antique is estimated to increase 10% over its value the previous year. The estimated value of the antique, in dollars, 2 years after purchase can be represented by the expression $200a$, where a is a constant. What is the value of a ?

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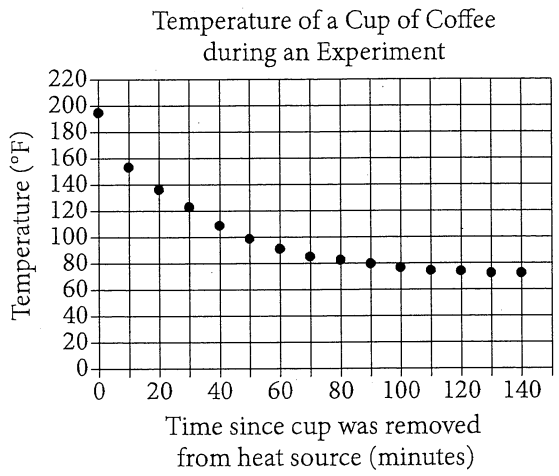
The graph of the exponential function h in the xy-plane, where $y = h(x)$, has a y-intercept of d, where d is a positive constant. Which of the following could define the function h ?

A) $h(x) = -3(d)^x$
B) $h(x) = 3(x)\,d$
C) $h(x) = d(-x)^3$
D) $h(x) = d(3)^x$

35

Gisela would owe \$15,500 in taxes each year if she were not eligible for any tax deductions. This year, Gisela is eligible for tax deductions that reduce the amount of taxes she owes by \$2,325.00. If these tax deductions reduce the taxes Gisela owes this year by d%, what is the value of d ?

Questions 5 and 6 refer to the following information.



In an experiment, a heated cup of coffee is removed from a heat source, and the cup of coffee is then left in a room that is kept at a constant temperature. The graph above shows the temperature, in degrees Fahrenheit (°F), of the coffee immediately after being removed from the heat source and at 10-minute intervals thereafter.

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Of the following, which best approximates the temperature, in degrees Fahrenheit, of the coffee when it is first removed from the heat source?

A) 75
B) 100
C) 155
D) 195

6

During which of the following 10-minute intervals does the temperature of the coffee decrease at the greatest average rate?

A) Between 0 and 10 minutes
B) Between 30 and 40 minutes
C) Between 50 and 60 minutes
D) Between 90 and 100 minutes

Questions 18-20 refer to the following information.

Jennifer bought a box of Crunchy Grain cereal. The nutrition facts on the box state that a serving size of the cereal is $\frac{3}{4}$ cup and provides 210 calories, 50 of which are calories from fat. In addition, each serving of the cereal provides 180 milligrams of potassium, which is 5% of the daily allowance for adults.

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If p percent of an adult's daily allowance of potassium is provided by x servings of Crunchy Grain cereal per day, which of the following expresses p in terms of x ?

A) $p = 0.5x$
B) $p = 5x$
C) $p = (0.05)^x$
D) $p = (1.05)^x$

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On Tuesday, Jennifer will mix Crunchy Grain cereal with Super Grain cereal for her breakfast. Super Grain cereal provides 240 calories per cup. If the total number of calories in one cup of Jennifer's mixture is 270, how much Super Grain cereal is in one cup of the mixture?

A) $\frac{1}{8}$ cup
B) $\frac{1}{4}$ cup
C) $\frac{1}{3}$ cup
D) $\frac{1}{2}$ cup

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Keith modeled the growth over several hundred years of a tree population by estimating the number of the trees' pollen grains per square centimeter that were deposited each year within layers of a lake's sediment. He estimated there were 310 pollen grains per square centimeter the first year the grains were deposited, with a 1% annual increase in the number of grains per square centimeter thereafter. Which of the following functions models $P(t)$, the number of pollen grains per square centimeter t years after the first year the grains were deposited?

A) $P(t) = 310^t$
B) $P(t) = 310^{1.01t}$
C) $P(t) = 310(0.99)^t$
D) $P(t) = 310(1.01)^t$