Exponential and %

Questions 4 and 5 refer to the following information.

The amount of money a performer earns is directly proportional to the number of people attending the performance. The performer earns $120 at a performance where 8 people attend.

4

How much money will the performer earn when 20 people attend a performance?

A) $960
B) $480
C) $300
D) $240

$\frac{\$120}{8} = \frac{x}{20}$

$8x = 2400$

$\frac{8x}{8} = \frac{2400}{8} = 300$

5

The performer uses 43% of the money earned to pay the costs involved in putting on each performance. The rest of the money earned is the performer's profit. What is the profit the performer makes at a performance where 8 people attend?

A) $51.60
B) $57.00
C) $68.40
D) $77.00

cost: 43%

profit: 52%

$120(.57)$

4

Nick surveyed a random sample of the freshman class of his high school to determine whether the Fall Festival should be held in October or November. Of the 90 students surveyed, 25.6% preferred October. Based on this information, about how many students in the entire 225-person class would be expected to prefer having the Fall Festival in October?

A) 50
B) 60
C) 75
D) 80

$225(.256)$

$225\left(\frac{4}{4}\right)$

$\left(\frac{100}{4} + \frac{100}{4} + \frac{25}{4}\right)$

$25 + 25 + 6 = 56$

4, 8, 12, 16, 20, 24

5

At Lincoln High School, approximately 7 percent of enrolled juniors and 5 percent of enrolled seniors were inducted into the National Honor Society last year. If there were 562 juniors and 602 seniors enrolled at Lincoln High School last year, which of the following is closest to the total number of juniors and seniors at Lincoln High School last year who were inducted into the National Honor Society?

A) 140
B) 69
C) 39
D) 30

14

A radioactive substance decays at an annual rate of 13 percent. If the initial amount of the substance is 325 grams, which of the following functions f models the remaining amount of the substance, in grams, t years later?

A) $f(t) = 325(0.87)^t$
B) $f(t) = 325(0.13)^t$
C) $f(t) = 0.87(325)^t$
D) $f(t) = 0.13(325)^t$

$(100\% - 13\%)$

$(1 - .13)$

17

The atomic weight of an unknown element, in atomic mass units (amu), is approximately 20% less than that of calcium. The atomic weight of calcium is 40 amu. Which of the following best approximates the atomic weight, in amu, of the unknown element?

A) 8
B) 20
C) 32
D) 48

$40\left(\frac{4}{5}\right) = 40\left(\frac{1}{5}\right) \cdot 4$

$\frac{40}{5} \cdot 4 = 32$

20

Alma bought a laptop computer at a store that gave a 20 percent discount off its original price. The total amount she paid to the cashier was p dollars, including an 8 percent sales tax on the discounted price. Which of the following represents the original price of the computer in terms of p ?

A) $0.88p$
B) $\frac{p}{0.88}$
C) $(0.8)(1.08)p$
D) $\frac{p}{(0.8)(1.08)}$

$P = R(1 - .20)(1.08)$

$R =$

21

Of the following four types of savings account plans, which option would yield exponential growth of the money in the account?

A) Each successive year, 2% of the initial savings is added to the value of the account.

B) Each successive year, 1.5% of the initial savings and $100 is added to the value of the account.

C) Each successive year, 1% of the current value is added to the value of the account.

D) Each successive year, $100 is added to the value of the account.

24

A customer's monthly water bill was $75.74. Due to a rate increase, her monthly bill is now $79.86. To the nearest tenth of a percent, by what percent did the amount of the customer's water bill increase?

A) 4.1%

B) 5.1%

C) 5.2%

D) 5.4%

$75.74(x) = 79.86$

$x = 1.054$

28

In planning maintenance for a city's infrastructure, a civil engineer estimates that, starting from the present, the population of the city will decrease by 10 percent every 20 years. If the present population of the city is 50,000, which of the following expressions represents the engineer's estimate of the population of the city t years from now?

A) $50{,}000(0.1)^{20t}$

B) $50{,}000(0.1)^{\frac{t}{20}}$

C) $50{,}000(0.9)^{20t}$

D) $50{,}000(0.9)^{\frac{t}{20}}$

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was $100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

37

What is the value of x in the expression?

Questions 37 and 38 refer to the following information.

The stock price of one share in a certain company is worth $360 today. A stock analyst believes that the stock will lose 28 percent of its value each week for the next three weeks. The analyst uses the equation $V = 360(r)^t$ to model the value, V, of the stock after t weeks.

37

What value should the analyst use for r ?

38

To the nearest dollar, what does the analyst believe the value of the stock will be at the end of three weeks? (Note: Disregard the $ sign when gridding your answer.)

$360(.72)^3 = 134.37$

Questions 37 and 38 refer to the following information.

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was $100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

37

What is the value of x in the expression?

1.02

38

Jessica's friend Tyshaun found an account that earns 2.5 percent interest compounded annually. Tyshaun made an initial deposit of $100 into this account at the same time Jessica made a deposit of $100 into her account. After 10 years, how much more money will Tyshaun's initial deposit have earned than Jessica's initial deposit? (Round your answer to the nearest cent and ignore the dollar sign when gridding your response.)

$6.11