

M205  
EXPONENTIAL  
GROWTH DECAY

1

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Markela opens a bank account that earns interest at a rate of 2% compounded annually. She puts \$200 in the account when she opens it and does not make any more deposits into or withdrawals from the account for 2 years. If the amount of money in the account after 2 years is given by the expression  $200(1.02)^2$ , which of the following expressions gives the amount of money in the account after 1 year?

- A)  $100(1.02)$
- B)  $200(1.02)$
- C)  $100(1.02)^2$
- D)  $200(1.01)^2$

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$$g(t) = 10,000(2)^{\frac{t}{2}}$$

The function  $g$  gives the number of green algae growing in a beaker, where  $t$  represents the amount of time, in hours, since the algae were placed in the beaker. What amount of time, in hours, is needed for the number of green algae in the beaker to double?

- A) 0.5
- B) 1.0
- C) 2.0
- D) 4.0

3

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)  $f(t) = 0.13(325)^t$

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$$P = 215(1.005)^{\frac{t}{n}}$$

The equation above can be used to model the population, in thousands, of a certain city  $t$  years after 2000. According to the model, the population is predicted to increase by 0.5% every  $n$  months. What is the value of  $n$ ?

- A) 3
- B) 4
- C) 12
- D) 36

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$$D = 5640(1.9)^t$$

The equation above estimates the global data traffic  $D$ , in terabytes, for the year that is  $t$  years after 2010. What is the best interpretation of the number 5,640 in this context?

- A. The estimated amount of increase of data traffic, in terabytes, each year
- B. The estimated percent increase in the data traffic, in terabytes, each year
- C. The estimated data traffic, in terabytes, for the year that is  $t$  years after 2010
- D. The estimated data traffic, in terabytes, in 2010

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$$A(t) = 50(2)^t$$

The function  $A(t)$  models the number of liters of a fluid in a tank after  $t$  hours. Which of the following models the number of liters of the fluid in the tank after  $m$  minutes?

- A)  $A(m) = 50(2)^{\frac{m}{60}}$
- B)  $A(m) = 50(2)^{60m}$
- C)  $A(m) = 50(2)^m$
- D)  $A(m) = 50(2)^m$

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13. A scholarship program increases the total value of scholarships awarded each year by 7% of the total value awarded the previous year. For the third year of the program, the total value of scholarships awarded was \$750,000. Which of the following equations best models the total value of scholarships awarded, in dollars, in the  $n$ th year of the scholarship program?

A)  $y = 750,000(0.07)^n$   
 B)  $y = 750,000(1.07)^n$   
 C)  $y = 750,000(0.07)^{n-3}$   
 D)  $y = 750,000(1.07)^{n-3}$

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13. In 2005, 10 phlox plants were planted in a garden. The number of phlox plants increased by 140% each year. Which of the following equations best models the estimated number of plants,  $P$ , in the garden  $t$  years after 2005?

A)  $P = 1.14(10)^t$   
 B)  $P = 2.4(10)^t$   
 C)  $P = 10(1.14)^t$   
 D)  $P = 10(2.4)^t$

9

7.

A) 3,000  
 B) 8,000  
 C) 12,000  
 D) 24,000

The function  $N$  models the amount of nickel-56, in Earth masses, remaining  $t$  days after a massive star explodes. About how many Earth masses of nickel-56 were there when the star exploded?

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14.  $f(x) = 2^x + 1$

The function  $f$  is defined by the equation above. Which of the following is the graph of  $y = -f(x)$  in the  $xy$ -plane?

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8.  $y = 4(2^x)$

Which of the following is the graph in the  $xy$ -plane of the given equation?

A. B. C. D.

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14. What is the graph of  $y = 4 - 2(0.5)^x$ ?

A. B. C. D.

1 B    3 A    5 D    7 D    9 D    11 D  
2 C    4 D    6 A    8 D    10 C    12 C