Georgia Milestones Unit 4 review (Exponentials)

Algebra 1

Choose the best answer for each question.

1. **(DOK 2)** The first term of the geometric sequence is 2 and the common ratio is 3. What is the 8th term of the sequence?
   A) 23 B) 4374 C) 39,366 D) 13,122

2. **(DOK 1)** A ball rolling down a slope travels continuously faster. Suppose the function $y = 1.3(1.41)^x$ describes the speed of the ball in inches per minute. How fast will the ball be rolling in 15 minutes? Round your answer to the nearest hundredth.
   A) 27.5 in/min B) 113.01 in/min C) 225.02 in/min D) 8860.07 in/min

3. **(DOK 1)** Always, Sometimes, or Never:
   The y-intercept of $y = ab^x$ is at a.
   A) Always B) Sometimes C) Never

4. **(DOK 1)** Suppose the depth of a lake can be described by a function $y = 334(0.976)^x$ where x represents the number of weeks from today. What is the depth of the lake today?
   A) .024 ft. B) 334 ft. C) 976 ft. D) 326 ft.

5. **(DOK 2)** Which of the following sets of ordered pairs satisfies an exponential function?
   A) {(0, 8), (1, 10), (2, 12), (3, 14)}
   B) {(-1, 100), (0, 50), (1, 25), (2, 12.5)}
   C) {(-1, 3), (0, 6), (1, 18), (2, 36)}
   D) {(0, -4), (1, 8), (2, 16), (3, -32)}

6. **(DOK 2)** The population of a small town is decreasing at a rate of 3% per year. In 2000, there were 1700 people. Which of the following exponential functions models this situation? Then find the population in 2012.
   A) $y = 2012(0.97)^t$; 1396 people
   B) $y = 1700(1.03)^t$; 2424 people
   C) $y = 1700(0.97)^t$; 1180 people
   D) $y = 2000(1.03)^t$; 2852 people

7. **(DOK 2)** Identify the following function as exponential growth or decay. Then give the rate of growth or decay as a percent. $y = a(0.8)^t$
   A) growth; 8% B) decay; 8% C) growth; 2% D) decay; 20%

8. **(DOK 1)** Which of the following satisfies **13 =** . $\mathbf{5(2)^x - 3}$ for x?

A) 3 B) 5 C) 10 D) 16

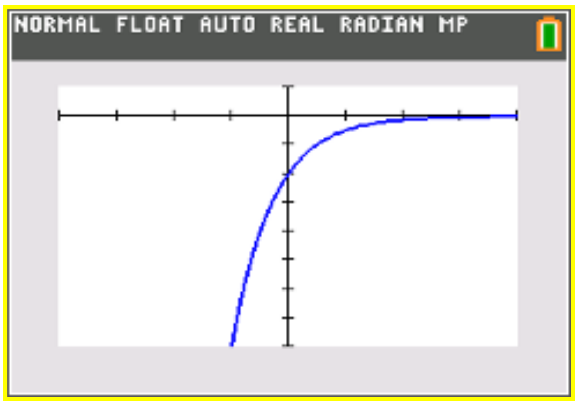
9. **(DOK 2)** Three years ago, the annual tuition at a college was $3000. The following year the tuition was $3300, and last year the tuition was $3630. If the tuition continues to grow in the same manner, what do you expect it to be 4 years from now?

A) $5100.00 B) 5314.68 C) $5846.15 D) $6430.77

10. **(DOK 2)** A local high school has 2000 students. Approximately 450 of the students are athletes. The number of student athletes is increasing at a rate of 8% per year. Write an exponential growth function to model the situation. Then determine the expected number of student athletes five years from now.

A) $y = 450(1.8)^t$; 8503
B) $y = 2000(0.8)^t$; 655
C) $y = 450(1.08)^t$; 661
D) $y = 2000(1.08)^t$; 2939

11. **(DOK 2)** Which of the following is the function of the graph shown?



A) $y = -2(4)^x$ B) $y = 2(4)^x$ C) $y = 2(\frac{1}{4})^x$ D) $y = -2(\frac{1}{4})^x$

12. **(DOK 2)** Write a compound interest function to model the following situation. Then find the balance after the given number of years: $4200 invested at a rate of 2.8% compounded quarterly; 6 years.

A) $A = 4200(1.007)^{4t}$; $4965.43
B) $A = 4200(1.7)^t$; $101, 377.79
C) $A = 4200(2.8)^{4t}$; $282,240
D) $A = 4200(1.028)^{4t}$; $8148.62

13. **(DOK 2)** Suppose that $10,000 is invested into an account that pays 5.65% interest compounded annually. Determine how long it will take the account to contain at least $15,000.

A) 6 years B) 7 years C) 8 years D) 9 years

14. **(DOK 2)** Write an exponential decay function to model the following situation. Then find the value of the function after the given amount of time:
The amount of a 10-mg dose of a certain antibiotic decreases in your bloodstream at a rate of 16% per hour; 4 hours

A) $y = 10(1.16)^t$; 18.11 mg
C) $y = 10(0.84)^t$; 4.98 mg
B) $y = 10(.16)^t$; 0.01 mg
D) $y = 10(1.84)^t$; 114.62 mg

15. **(DOK 3)** Always, Sometimes, or Never:
When a is negative, the graph of $y = ab^x$ is entirely contained in quadrants III & IV.

A) Always
B) Sometimes
C) Never

16. **(DOK 3)** Always, Sometimes, or Never:
When b is a fraction, the graph of $y = ab^x$ is contained entirely in quadrants I & II.

A) Always
B) Sometimes
C) Never

17. **(DOK 2)** An exponential function written in standard form is $y = ab^x$+c. Which statement is NOT true?

A) b can equal 1
C) c can be negative or positive
B) b must be greater than 0
D) x can be negative or positive

18. **(DOK 3)** Mendelevium-258 has a half-life of approximately 52 days. Find the amount of mendelevium-258 left from a 44-gram sample after 156 days.

A) 6.5 g
B) 9.77 g
C) 4.82 g
D) 5.5 g

19. **(DOK 3)** The annual tuition at a community college since 2001 is modeled by the equation $C = 1500(1.08)^n$, where C is the tuition cost and n is the number of years since 2001. Going by this model, predict what the tuition would have cost in 2000.

A) $1392.00
B) $1388.89
C) $1380.00
D) $1498.92

20. **(DOK 3)** Moore's law states that the maximum number of transistors that can fit on a silicon chip doubles every two years. The function $f(x) = 42(1.41)^x$ models the number of transistors, in millions, that can fit on a chip, where x is the number of years since 2000. Using this model, in about what year can a chip hold 1 billion transistors?

A) 2009
B) 2024
C) 2036
D) 2050

ANSWER KEY

1. B
2. C
3. A
4. B
5. B
6. C
7. D
8. B
9. C
10. C
11. D
12. A
13. C
14. C
15. A
16. B
17. A
18. D
19. B
20. A