Unit 5: Comparing and Contrasting Functions

1. The table below shows the values of a function.

x	f(x)
4	7
6	11
8	15
10	19

DOK: 2

Which best describes the function, based on the average rates of change?
   A.   The function is linear because the average rates of change are all the same, 2.
   B.   The function is exponential because each average rate of change is 2 times the previous rate of change.

   C.   The function is linear because the average rates of change are all the same, 4.
   D.   The function is exponential because each average rate of change is 4 times the previous rate of change.

2. The census bureau tracked the population in the city of Weston over four years. The table below shows the populations measured during that time.

DOK: 2

Year	Population
2006	36,000
2007	39,600
2008	43,560
2009	47,916

Does the population growth show linear growth, exponential growth, quadratic growth, or none of them?
   A.   Linear
   B.   Exponential

   C.   Quadratic
   D.   None of the above

3. The properties of two linear functions need to be compared. The function f(x) has a slope of 2 and crosses the y-axis at the point (0,4). The function g(x) is represented in the function table below.

DOK: 3

x	g(x)
-7	-2
-5	-1
-3	0
-1	1
1	2

Which represents the intervals in which the outputs of the functions are negative?
   A.   f(x) is negative when $x < 4$;
        g(x) is negative when $x < 1$
   B.   f(x) is negative when $x < -2$;
        g(x) is negative when $x < -3$

   C.   f(x) is negative when $x < -2$;
        g(x) is negative when $x < 1$
   D.   f(x) is negative when $x < -4$;
        g(x) is negative when $x < -3$

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4.
Doris decided to start a stamp collection. She hopes to triple the total number of stamps that she has in her collection each year. If she has 3 stamps when she starts her collection, which sequence represents the number of stamps she wants to have in her collection each year?

DOK: 2

A.   3,9,27,54,108…

B.   3,9,15,21,27…

C. 3,6,9,12,15…

D.   3,9,27,81,243…

5.
Sheila deposited her money in a savings account and checks the balance of the account each month. Her initial balance and the balances after the first four months are listed below.

$40, $42, $44.10, $46.31, $48.62

DOK: 2

What is the constant percent rate in this geometric series?

A.   2%

B.   5%

C. 10%

D.   20%

6.
The rates of change of two functions are being compared. One function, f(x), is represented by the equation $f(x) = 4x + 2$. The other function, g(x), is represented by the table below.

DOK: 3

x	g(x)
-1	-2
1	4
2	7
5	16

Which statement is true?

A.   The rate of change for f(x) is greater than the rate of change for g(x).

B.   The rate of change for g(x) is greater than the rate of change for f(x).

C. The rates of change for f(x) and g(x) are equal.

D.   The rates of change cannot be compared because f(x) is a linear function and g(x) is an exponential function.

7.
Use the table below to answer the following question.

DOK: 3

Function A		Function B
Year	**Portfolio Balance**	
0	$10	Ava earns 40% interest every year on the money she put into a retirement fund. She originally invested $200.
1	$30	
2	$90	
3	$270	

Which function has a greater y-intercept?

A.   Function A

B.   Function B

C. They are equal.

D.   Cannot be determined from the information given.

8. What type of function is represented by the equation below?
    $2x + 3y = -12$

    DOK:
    1

A. Linear	B. Exponential
C. Quadratic	D. Cubic

9. What type of function is represented by the equation below?
    $f(x) = 4^x - 10$

    DOK:
    1

A. Linear	B. Exponential
C. Quadratic	D. None of the above

10. What type of function is represented by the equation below?
    $f(x) = 3x^2 - 2x + 4$

    DOK:
    1

A. Linear	B. Exponential
C. Quadratic	D. None of the above

11. What type of function is represented by the table of values?

    DOK:
    1

x	-2	-1	0	1	2
y	20	10	5	2.5	1.25

A. Linear	B. Exponential
C. Quadratic	D. None of the above

12. What type of function is represented by the table below?

x	-4	-3	-2	-1	0
y	45	24	9	0	-3

    DOK:
    1

A. Linear	B. Exponential
C. Quadratic	D. None of the above

Unit 5: Comparing and Contrasting Functions

13. Write a recursive rule for the following sequence:

$$5,11,17,23...$$

DOK: 2

A. $a_n = 5a_{n-1}$

B. $a_n = 6a_{n-1}$

C. $a_n = a_{n-1} + 5$

D. $a_n = a_{n-1} + 6$

14. Write a recursive rule for the following sequence:

$$1,3,9,27...$$

DOK: 2

A. $a_n = 3a_{n-1}$

B. $a_n = 1a_{n-1}$

C. $a_n = a_{n-1} + 3$

D. $a_n = 3a_{n-1} + 1$

15. Which function best models the data: $\{(-4,-2),(-2,-1),(0,0),(2,1),(4,2)\}$

DOK: 2

A. $y = \left(\dfrac{1}{2}\right)^x$

B. $y = \dfrac{1}{2}x^2$

C. $y = \dfrac{1}{2}x$

D. $y = \left(\dfrac{1}{2}x\right)^2$

16. A city's population is increasing at a rate of 2% per year. Which type of model describes this situation?

DOK: 1

A. Exponential

B. Quadratic

C. Linear

D. None of these

17. Which data set is best modeled by a linear function?

A. $(-2,0),(-1,2),(0,-4),(1,-1),(2,2)$

B. $(-2,2),(-1,4),(0,6),(1,16),(2,32)$

DOK: 1

C. $(-2,2),(-1,4),(0,6),(1,8),(2,10)$

D. $(-2,0),(-1,5),(0,7),(1,5),(2,0)$

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18.   Tanya has $2000 in savings. She wants to save more money. She is considering two plans. Under plan A, she will increase her balance by $1000 per year. Under plan B, she will increase her

DOK: balance by 20% each year. How much more will she save with plan B after 10 years? Round your

3   answer to the nearest dollar.

        A. $383   B. $9,562

        C. $12,000   D. $12,383

19.   The first term of a geometric sequence is 512, and the common ratio is 0.5. What is the eighth term of the sequence?

DOK: A.   4   B.   22.63

2

        C. 8   D.   2

20.   Look for a pattern in the data set. Which kind of model best describes the data?

DOK:

2

Time (hours)	Number of bacteria
0	2,000
1	5,000
2	12,500
3	31,250

        A.   Cubic   B.   Quadratic

        C. Exponential   D.   Linear

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ANSWERS:

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