1. A certain type of tree doubles its weight every year for the first ten years. If it weighs 5 pounds when it is planted, which expression would calculate how much it will weigh at the end of the first 10 years?

А.	5• 10 ²	В.	$2 \cdot 10^{5}$
C.	$10 \cdot 5^2$	D.	$5 \cdot 2^{10}$

- 2. Your hair is 7 inches long right now. It grows about 2 inches per month. Which equation would correctly calculate how long it will be in *m* months?
 - A. $h = 7^{m} + 2$ B. h = 7m + 2C. h = 2m + 7D. $h = 2^{m} + 7$
- **3.** You have a lawn with 14 dandelions on it. You hear that the number of dandelions will increase by 9 every week. Write an equation that would calculate how many dandelions the lawn will have after *x* weeks.
- 4. A new university hopes to double its enrollment each year for the next 8 years. It is starting with 1,000 students. How many people will be enrolled in 8 years?

А.	1,016	B .	8,002
С.	256,000	D.	64,000

- 5. A flood doubles its square footage every week. Right now it is 19 square miles. Which of the following would calculate how big it will be in *w* weeks?
 - A. $A = 19 + 2^{w}$ B. $A = 19 \cdot 2^{w}$ C. A = 19 + 2w D. A = 2 + 19w

- 6. A new company is wanting to triple its profit every year. If it starts with a profit of \$4000, how much will their profit be after 6 years?
- 7. You plant a sunflower when it is 5 inches tall. It grows 3 inches per week. Which expression will calculate how tall it will be in 7 weeks?
 - A. 105 inches B. 10,935 inches
 - C. 26 inches D. 38 inches

8. How many rabbits would be in a population, if they start with 7 rabbits and double four times?

9. Which explicit equation represents the pattern in the table below?

X	у
1	80
2	67
3	54
4	41
5	28

- A. y = -13x + 80
- B. y = 93x 13
- C. $y = -13^x + 93$

D.
$$y = -13x + 93$$

- 10. Tyson's car displays the number of gallons remaining in his gas tank. When he fills his tank, he has 20 gallons of gas. After traveling 2, 3, and 4 miles, he has 16, 14, and 12 gallons of gas left, respectively. Which equation represents the remaining gallons of gas after traveling *x* miles?
 - A. y = 20 2x B. y = 20x 2
 - C. y = 20x D. y = 20 + 2x
- **11.** JT starts working on a puzzle that his sister was doing. There were 150 pieces connected when he started. After 2, 3, and 4 hours of working on the puzzle, he has 280, 345, and 410 total pieces connected, respectively.

12. Which explicit equation represents the relationship between *x* and *y* in the graph below?



13. Which equation represents the relationship between *x* and *y* shown in the graph below?



14. Write an equation for the following graph:



- **15.** A population of bears is decreasing. The population this year is 150 bears. After 1 year, it is estimated that the population will be 120 bears. After 2 years, it is estimated that the population will be 96 bears. Which equation describes the bear population in any year x?
 - A. $y = 150 \cdot 0.8^{x}$

B.
$$y = 120 \cdot 0.8^{x}$$

C.
$$y = 120 \cdot 1.25^{x}$$

D.
$$y = 150 \cdot 1.25^{x}$$

16. Which equation represents the relationship between *x* and *y* shown in the table below?

x	у
0	4
1	64
2	1024
3	16384

A. y = 16 + 4xB. y = 4 + 16xC. $y = 4 \cdot 16^x$ D. $y = 16 \cdot 4^x$ **17.** Write an equation that represents the relationship between *x* and *y* shown in the table below.

Х	Y
0	63
2	91
3	105
4	119

18. The population of a small town was 900. After 1 and 2 years, the population was 1170 and 1521, respectively. Which function describes the relationship between year and town population?

A.
$$y = 900 \cdot (1.3)^x$$
 B. $y = 270x + 900$

C.
$$y = 900 \cdot (0.77)^x$$
 D. $y = 900x + 270$

19. Which equation represents the relationship between *x* and *y* shown in the table below?

X	у
0	8
1	96
2	1152
3	13824

- A. y = 8 + 12x B. y = 8x + 12
- C. $y = 8 \cdot 12^x$ D. $y = 12 \cdot 8^x$

20. Write an equation that represents the relationship between *x* and *y* shown in the table below.

Х	Y
1	1
2	6
3	36
4	216

21. Which equation that represents the relationship between *x* and *y* shown in the graph below?



C. y = -4x - 6 D. $y = (-6) \cdot 4^x$

22. Write an equation that would calculate the total number of hearts in each figure.



23. Which equation describes how many dots there are after x minutes?



- **24.** Write an equation that represents exponential decay.
- **25.** Write an equation that represents exponential growth.
- **26.** Which equation represents exponential decay?

A.
$$y = 8.6(7.22)^x$$

B. $y = 1.05(7.95)^x$
C. $y = 0.17(3.26)^x$
D. $y = 17.8(0.06)^x$

27. Which equation shows exponential growth?

A. $y = 0.5(0.9)^x$ B. $y = 2(1.98)^x$ C. $y = 11.8(0.92)^x$ D. $y = 1.8(0.21)^x$

- 28. Write an equation that has faster exponential growth than the following equation: $y = 3.5(1.4)^{x}$
- 29. Write an equation that has faster exponential decay that the following equation: $y = 8.6(0.5)^{x}$
- **30.** Which equation represents the fastest exponential growth?

A. $y = 7.62(0.22)^x$	B. $y = 1.22(2.62)^x$
C. $y = 0.86(3.46)^x$	D. $y = 0.46(0.86)^{x}$

31. Which equation represents the fastest exponential decay?

A. $y = 7.62(0.22)^x$	B. $y = 1.22(2.62)^x$
C. $y = 0.86(3.46)^x$	D. $y = 0.46(0.86)^x$

- **32.** Write an equation that has an initial value of 3.5 and increases at a rate of 2.4%.
- **33.** Write an equation that has an initial value of 25 and declines at a rate of 20%.
- **34.** Which equation correctly shows an initial value of 4 and declining at a rate of 12%?

A. $y = 4(1+0.12)^x$ B. $y = 12(1+0.04)^x$

C. $y = 4(1-0.12)^x$ D. $y = 4(1-12)^x$

- **35.** Given the equation $y = 17(1.08)^x$ which of the following is true:
- **A.** The initial value is 17 and it is increasing at a rate of 8%.
- **B.** The initial value is 1.08 and it is increasing at a rate of 17%.
- **C.** The initial value is 17 and it is decreasing at a rate of 8%.
- **D.** The initial value is 1.08 and it is increasing at a rate of 1.08%.
- **36.** Eros Industries bought a laser printer in 2000 for \$1,800. It is expected to decrease in value at a rate of 11% per year. What will the value of the printer be 19 years? Round to the nearest dollar.
 - A. \$6B. \$13074C. \$2D. \$197
- **37.** The Smiths bought an apartment for \$125,000. Assuming that the value of the apartment will increase in value, at most 2% each year, how much could the apartment be worth in 3 years?

A.\$	216,000	B.	\$337,500
C.	\$132,651	D.	\$125,752

38. Addie gets a new job that pays \$7.50 an hour. Each month she receives a 4.5% pay raise. How much will she make after 8 months?

39. The value of a new car purchased for

\$30,000 decreases 1.3% per year. Write an exponential decay model for the value of the car.

A. $y = 30,000(1.3)^{t}$ B. $y = 30,000(1.013)^{t}$ C. $y = 30,000(.987)^{t}$ D. $y = 30,000(.87)^{t}$ **40.** You buy a new home and predict it will increase in value 8% each year. You pay \$220,000 for the home. How much will it be worth in 20 years?

А.	\$1,025,411	В.	\$187,351
----	-------------	----	-----------

- C. \$258,008 D. \$41,513
- **41.** Anthony borrows \$500 and is going to pay off (decrease) the amount by 20% each month. Write an equation that models how much he still owes.
- **42.** Graph accurately using a table. $y = 3(2)^{x}$



