Chapter 1 Review

1. Given each rule, write the first 4 terms of the sequence. Indicate whether each sequence is arithmetic or geometric.

a) $a_n = 256\left(\frac{3}{4}\right)^{n-1}$

b) $a_1 = 2;\ a_n = 3a_{n-1}$

c) $a1 = -54;\ a_n = a_{n-1} + 7$

d) $a_n = 3250 - 75n$

2. Write an equation in $y = mx + b$ form for each linear function described.

a) slope = $\frac{5}{2}$, y-intercept = (0, 10)

b) slope = −2, contains the point (5, −7)

c) contains the points (5, -3) and (-4, 0)

d)

x	y
2	21
4	18
6	15
8	12
10	9

3. For each table below representing exponential data, write the common ratio and the function relating the variables.

a)

x	y
0	243
1	81
2	27
3	9

b)

x	y
1	500
2	1000
3	2000
4	4000

4. The population of a certain bacteria over a period of time is shown in the table below, where x represents the number of days since the bacteria's population was first recorded and y represents the population.

NUMBER OF DAYS, x	0	1	2	3	4	5	6	7
POPULATION, y	123	290	715	1,695	4,048	9,769	23,500	56,400

a. Is the data, linear, quadratic, cubic, or exponential?
b. Generate a function to model this data.
c. According to your model, what will be the population of the bacteria after 9 days?
d. According to your model, when will the population of the bacteria exceed 10,000,000?

For problems 5 – 10, determine if the function represented is linear, quadratic, cubic, or exponential, then write a function equation relating the variables.

5.

x	y
1	11
2	22
3	37
4	56
5	79

6.

x	y
0	12
2	9
4	6
6	3
8	0

7.

x	y
0	8
1	12
2	18
3	27
4	40.5

8.

x	y
0	-8
1	-6
2	8
3	46
4	120

9.

x	y
0	6
1	$9\frac{1}{3}$
2	$26\frac{2}{3}$
3	60
4	$111\frac{1}{3}$

10.

x	y
-2	19
-1	13
0	5
1	-5
2	-17

Use the following situation to answer questions 11-14.

Amanda drew a sequence of figures as shown. She then recorded the number of dots used for each figure and recorded the data in a table.

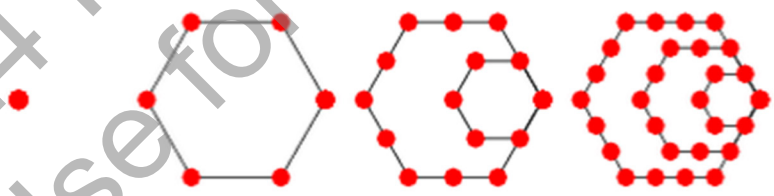


FIGURE NUMBER, n	1	2	3	4	5	n
NUMBER OF DOTS, $D(n)$	1	6	15	28		

11. Using the pattern of second differences, determine the number of dots that would appear in the 5th figure.

FIGURE NUMBER, n	1	2	3	4	5	n
NUMBER OF DOTS, $D(n)$	1	6	15	28		

+5 +9 +13

+4 +4

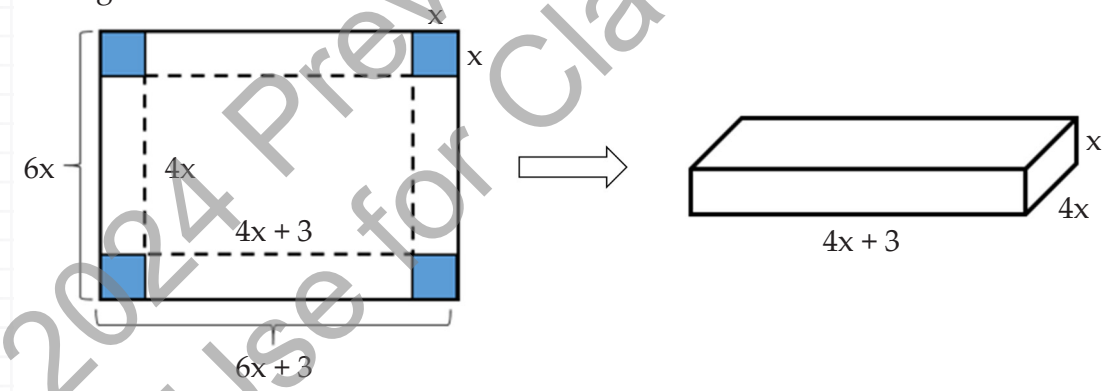
12. Write a quadratic function to represent the relationship between n and $D(n)$.

13. How many dots would appear in the 9th figure?

14. In which figure would there be 435 dots?

Use the following situation to answer questions 15-17.

Fred created a box out of a sheet of cardboard in which the length was 3 inches longer than its width. The height of the box was created by cutting squares from each corner of the cardboard and folding up $\frac{1}{6}$ of the width of the cardboard on all sides as shown in the figure.



Fred made several boxes that were similar in dimensions to the first box and recorded the volume of each as compared to the height.

HEIGHT OF BOX (INCHES), x	1	2	3	4	5	x
VOLUME OF BOX (CUBIC INCHES), V	28	176	540	1,216	2,300	

15. Using the pattern of third differences, determine the volume of a box with a height of 6 inches.

HEIGHT OF BOX (INCHES), x	1	2	3	4	5	x
VOLUME OF BOX (CUBIC INCHES), V	28	176	540	1,216	2,300	

+148 +364 +676 +1,084

+216 +312 +408

+96 +96

16. Write a cubic function to represent the relationship between x and V.

17. What would be the volume of a box with a height of 2.5 inches?

Use the following situation to answer questions 18-20.

A shipping company packs candied popcorn in cylindrical cartons in which the height and radius are the same. Various sizes of the filled cartons and weights are shown in the table below.

RADIUS OF CARTON, r (IN)	WEIGHT OF CARTON, W (OUNCES)
1	6
2	50
3	170
4	402
5	785
6	1357

18. Does the data best fit a linear, quadratic, cubic, or exponential model? Justify your answer.

19. Write a function to model the relationship between r and W.

RADIUS OF CARTON, r (IN)	WEIGHT OF CARTON, W (OUNCES)			
0	0			
		6		
1	6		38	
		44		38
2	50		76	
		120		36
3	170		112	
		232		39
4	402		151	
		383		38
5	785		189	
		572		
6	1357			

20. According to your model, what would be the approximate height of a carton that weighed about 138 ounces?

MULTIPLE CHOICE

21. Rhonda has \$150 in her savings account but plans to add \$30 each week from money she earns from babysitting. Which function represents the balance of her savings account, S, after w weeks?

A. $S = 30 + 150w$
B. $S = 150(30)w$
C. $S = (150 + 30)w$
D. $S = 150 + 30w$

22. In a table showing values of x and $f(x)$ from the quadratic function, $f(x) = ax^2 + bx + c$, the second differences of the f(x) values gives you what information related to the function?

A. a
B. 2a
C. 6a
D. a + b + c

23. Which of the following equations best models the quadratic data given below?

x	0	1	2	3	4	5	6
y	15	19	35	63	103	155	219

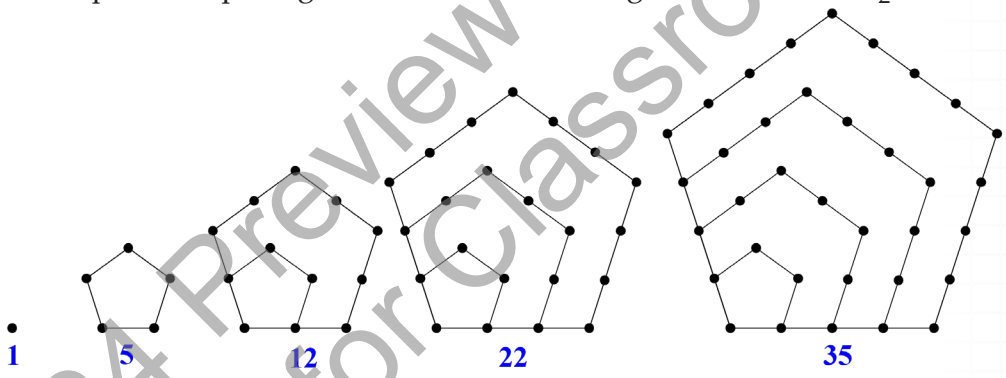
A. $6x^2 - 1.9x + 14.8$
B. $6x^2 + 1.9x + 14.8$
C. $x^2 - 1.9x + 4.2$
D. $3x^2 - 19x + 18.4$

24. For the data shown in the table below, what is the coefficient of the x^3 term?

x	0	1	2	3	4	5	6	7
$y = ax^3 + bx^2 + cx + d$	-200	-186	-144	-50	120	390	784	1326

A. 24
B. 12
C. 6
D. 4

25. In a sequence of pentagonal numbers, the n^{th} figure consists of $\frac{3n^2 - n}{2}$ dots.



How many dots make up the 9^{th} pentagonal figure?

A. 92
B. 117
C. 234
D. 360