Module 3 Test Review Name: key

Writing Equations Given either a Pattern or a Table

1.

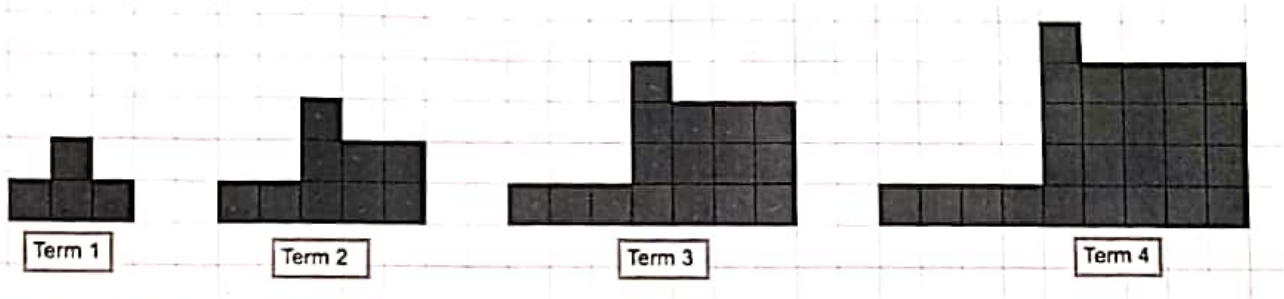


Table:

Fig. #	Number of Squares
0	1
1	4
2	9
3	16
4	25
10	121
100	10201

>3 >2
>5 >2
>7 >2
>9

Explicit equation: $y = x^2 + 2x + 1$

Find $f(43)$= 1936

$y = x^2 + bx + 1$
$4 = 1^2 + b(1) + 1$
$4 = 2 + b$
$b = 2$

2.

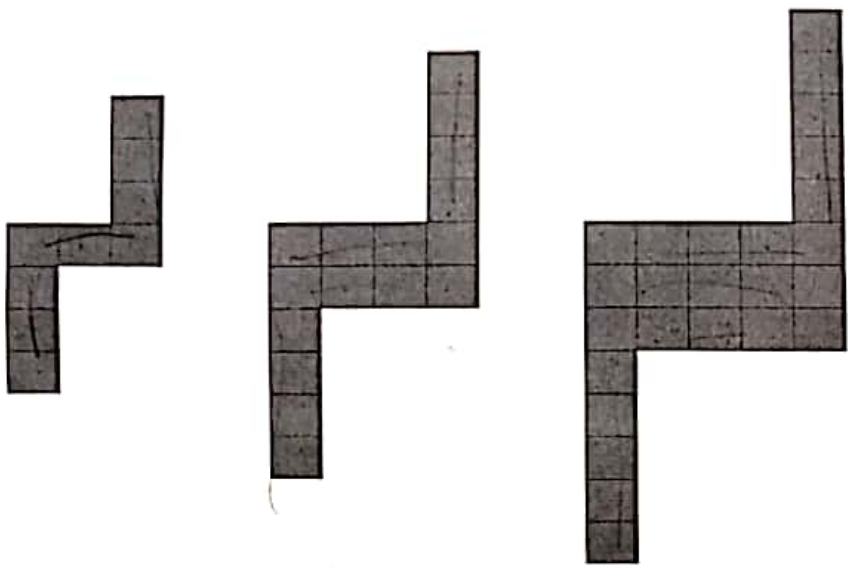


Table:

Fig. #	Number of Squares
0	4
1	9
2	16
3	25
4	36
10	144
100	10404

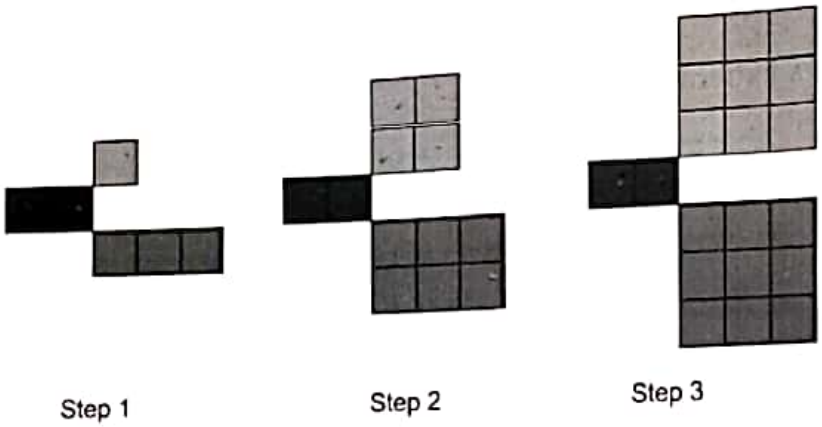
>5 >7 >9 >11

Explicit equation: $y = x^2 + 4x + 4$

Find $f(43)$= 2025

$y = x^2 + bx + 4$
$9 = 1^2 + b + 4$
$b = 4$

3.



Step 1 Step 2 Step 3

Table:

Fig. #	Number of Squares
0	2
1	6
2	12
3	20
4	30
10	132
100	10302

Explicit equation: $y = x^2 + 3x + 2$

Find $f(43)$= 1980

$6 = 1^2 + b(1) + 2$

$6 = 3 + b \quad b = 3$

For each table 1) Identify the type of function. 2) Find the differences or common ratio. 3) Write the explicit equation.

4. What type of functions is this: Linear, Exponential, or Quadratic

Explicit equation: $y = 2x^2 + 5$

or

$2x^2 + 0x + 5$

x	$f(x)$	1st Difference	2nd Difference
-2	13		
-1	7	-6	
0	5	-2	+4
1	7	+2	+4
2	13	+6	
3	23	+10	
4	37	+14	

$y = 2x^2 + bx + 5$

$7 = 2(1)^2 + b(1) + 5$

$7 = 2 + 5 + b$

$7 = 7 + b \quad b = 0$

5. What type of functions is this: Linear, Exponential, or Quadratic

Explicit equation: $y = x^2 - x + 4$

x	$f(x)$	1st Difference	2nd Difference
2	6		
3	10	4	
4	16	6	2
5	24	8	
6	34	10	
7	46	12	
8	60	14	

$y = x^2 + bx + c$

$6 = 2^2 + 2b + 4$

$6 = 4 + 2b + 4$

$-2 = 2b \quad b = -1$

6. What type of functions is this: Linear, Exponential, or Quadratic

Explicit equation:

$y = 1 \cdot 3^x$

or

$y = 3^x$

x	$f(x)$	1st Difference	2nd Difference
0	1	2	4
1	3	6	12
2	9	18	36
3	27	54	
4	81		

7. What type of functions is this: Linear, Exponential, or Quadratic

Explicit equation: $y = -3x^2 + 2x - 3$

x	$f(x)$	1st Difference	2nd Difference
2	-11	-13	-6
3	-24	-19	
4	-43	-25	
5	-68	-31	
6	-99	-37	
7	-136	-43	
8	-179		

$y = -3x^2 + bx - 3$

$-11 = -3(2)^2 + 2b - 3$

$-11 = -12 + 2b - 3$

$-11 = -15 + 2b$

$4 = 2b \quad b = 2$

8. What type of functions is this: Linear, Exponential, or Quadratic

Explicit equation:

$y = -5x + 6$

x	$f(x)$	1st Difference	2nd Difference
2	-4	-5	0
3	-9	-5	
4	-14	-5	
5	-19	-5	
6	-24		
7	-29		
8	-34		

For each context given, identify whether it represents a linear, exponential, or quadratic model, find the explicit function, fill in the table, and solve for a particular input given.

15. Idaho sees an increase in the number of flies in the fall. On September 1st, a store owner observed 8 flies on the patio. The next day he counted 12 flies on the patio, and the day after that he observed 20 flies on the patio. If this pattern continues, how many flies will there be on September 30th??

a. Linear, Exponential, (Quadratic)

b. Explicit Function: $y = 2x^2 - 2x + 8$

$y = 2x^2 + bx + 8$ $\quad 2(1)^2 + b + 8 = 8$, $2 + b + 8 = 8$, $b = -2$

filling

Day	# of Flies
1	8
2	12
3	20
4	32

4, 4 > 4, 8, 12 > 4

c. $f(30) =$ _____

16. A student wanted to observe the bacteria growth on the water fountain at her school for two weeks. As she observed the bacteria, she reported that on day one there were 18 bacteria in her sample. The next day she observed 72 bacteria, and the third day she observed 288 bacteria in her sample. If this pattern continues, how many bacteria would be in the culture on day fourteen?

a. Linear, (Exponential), Quadratic?

b. Explicit Function: $y = 4.5 \cdot 4^x$

c. $f(14) =$ 1,207,959,552

Day	# of Bacteria
1	18
2	72
3	288
4	1152

×4, ×4

17. Johnny is opening a fence building business. For his first job he is building a fence around his local park. Once all the material is delivered to the park and the old fence has been removed, it will take his crew two hours to set up each thirty foot section of fence.

a. (Linear), Exponential, Quadratic?

b. Explicit Function: $y = 15x$

Hours	Amount of Fencing (ft.)
1	15
2	30
3	45
4	60
5	75
6	90

c. If his crew has put in 24 hours of work, how many feet of fence have they set up?

$15(24) =$ 360 ft

d. How many hours will it take to set up all 500 feet of fence around the perimeter of the park?

$500 = 15x$ $\quad$ 33 1/3 hours

Application

9. An object is launched at 19.6 meters per second (m/s) from a 58.8 meter tall platform. The equation for the object's height s meters high at time t seconds after launch is $s(t) = -4.9t^2 + 19.6t + 58.8$.

a. What does $s(1)$ mean in the context of the problem?

how high the object is after 1 second

b. Find $s(1)$ 73.5 m

c. What does $s(t) = 0$ mean in the context of the problem? The object is 0 ft high (hits ground)

d. Find $s(t) = 0$ to the closest second (hint use a table and a graph)

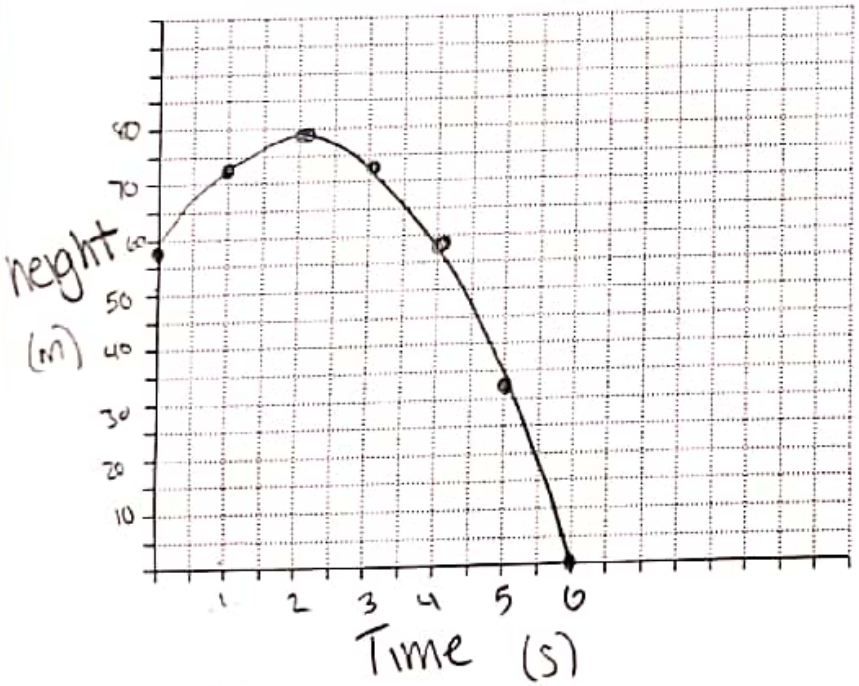
6 seconds

e. What would $f(0) = 58.8$ mean in this context? at 0 seconds, the object is 58.8 m high

f. What is the highest height the object will reach?

78.4 m

g. When will the object reach the max height? 2 seconds



s	M
0	58.8
1	73.5
2	78.4
3	73.5
4	58.8
5	33.8
6	0
7	

10. $(-5x + 2) + (7x - 13)$

$2x - 11$

11. $(12x + 3) + (-4x + 3)$

$8x + 6$

12. $(2x + 7) - (5x + 3)$

$-3x + 4$

13. $(6x^2 - 1) \div (x^2 \div 10)$

$5x^2 + 9$

14. $(2x + 7)(5x + 3)$

$10x^2 + 6x + 35x + 21$

$= \boxed{10x^2 + 41x + 21}$

15. $-2(6x - 1)(x - 10)$

$(-12x + 2)(x - 10)$ $= -12x^2 + 120x + 2x + 20$

$= \boxed{-12x^2 + 120x + 20}$

16. $2(8x + 3)(3x - 4)$

$(16x + 6)(3x - 4)$

$48x^2 - 64x + 18x - 24$ $\boxed{48x^2 - 46x - 24}$

17. $3(-5x + 2)(7x - 13)$

$(-15x + 6)(7x - 13)$

$-105x^2 + 195x + 42x - 78$ $= \boxed{-105x^2 + 237x - 78}$

18. $(12x + 3)(-4x + 3)$

$-48x^2 + 36x - 12x + 9$ $= \boxed{-48x^2 + 24x + 9}$