

Writing the Recursive Formulas for a Quadratic Function

$$f(n) = f(n-1) + \text{Linear Rate of Change}$$

$$f(x) = f(x-1) + mx + b$$

$$m = 2^{\text{nd}} \text{ Difference}$$

x	f(x)	1st difference	2nd difference
1	10		
2	35	25	12
3	72	37	12
4	121	49	12
5	182	61	12

$$f(x) = f(x-1) + 12x + b$$

$$f(3) = 35 + 12(3) + b = 72$$

$$35 + 36 + b = 72$$

$$71 + b = 72$$

$$-71$$

$$b = 1$$

$$b = 1$$

$$f(x) = f(x-1) + 12x + 1$$

$$f(1) = 10$$

x	f(x)	1st difference	2nd difference
1	7		
2	10	3	2
3	15	5	2
4	22	7	2

$$f(x) = f(x-1) + 2x + b$$

$$f(2) = 7 + 2(2) + b = 10$$

$$7 + 4 + b = 10$$

$$11 + b = 10$$

$$-11$$

$$b = -1$$

$$b = -1$$

$$f(x) = f(x-1) + 2x - 1$$

$$f(1) = 7$$

You Try!!

x	f(x)	1st difference	2nd difference
1	13		
2	16	3	2
3	21	5	2
4	28	7	2

$$f(x) = f(x-1) + 2x + b$$

$$f(2) = 13 + 2(2) + b = 16$$

$$13 + 4 + b = 16$$

$$17 + b = 16$$

$$-17$$

$$b = -1$$

$$b = -1$$

$$f(x) = f(x-1) + 2x - 1$$

$$f(1) = 13$$

X	f(x)	1st diff	2nd diff
4	67		
5	103	36	8
6	147	44	8
7	199	52	

second difference

$$f(x) = f(x-1) + 8x + b$$

$$f(5) = 67 + 8(5) + b = 103$$

$$67 + 40 + b = 103$$

$$107 + b = 103$$

$$-107 \quad -107$$

$$b = -4$$

$$f(x) = f(x-1) + 8x - 4$$

$$f(1) = 7$$

$$f(4) = 67$$

X	f(x)	1st diff	2nd diff
1	7		
2	19	12	8
3	39	20	8
4	67	28	8
5	103	36	8
6	147	44	8
7	199	52	