lulumath

Graphing Quadratic Relations and Second Differences

Video Notes

Video Link

Graphing Quadratic Relations and Looking at Second Differences

Graph the following quadratic relation using integers on the interval $-1 \le x \le 5$. Then, find their second differences.

$y = ax^2 + bx + c$ ← standard form

$y = 2x^2 - 8x - 1$

x	y	1st differences	2nd differences
-1	9		
		-10	
0	-1		4
		-6	
1	-7		4
		-2	
2	-9		4
		2	
3	-7		4
		6	
4	-1		4
		10	
5	9		

$y = 2x^2 - 8x - 1$

$y = 2(-1)^2 - 8(-1) - 1$

$y = 2(1) - 8(-1) - 1$

$y = 2 + 8 - 1$

$y = 9$

$y = 2x^2 - 8x - 1$

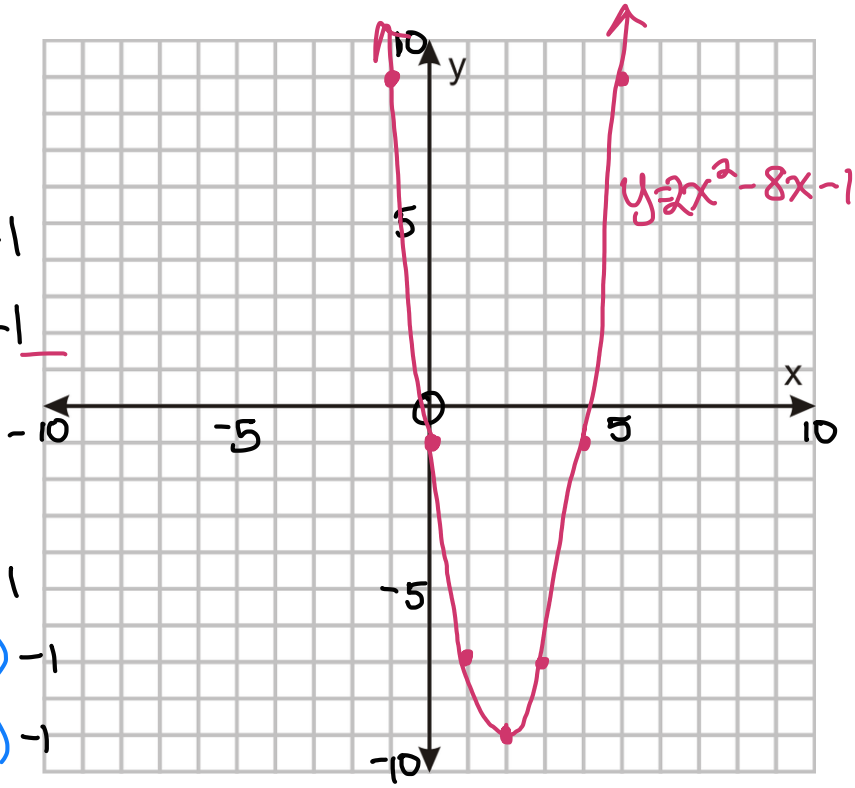
$y = 2(5)^2 - 8(5) - 1$

$y = 2(25) - 8(5) - 1$

$y = 50 - 40 - 1$

$y = 9$

The second differences are constant, ∴ this relation/function is quadratic.

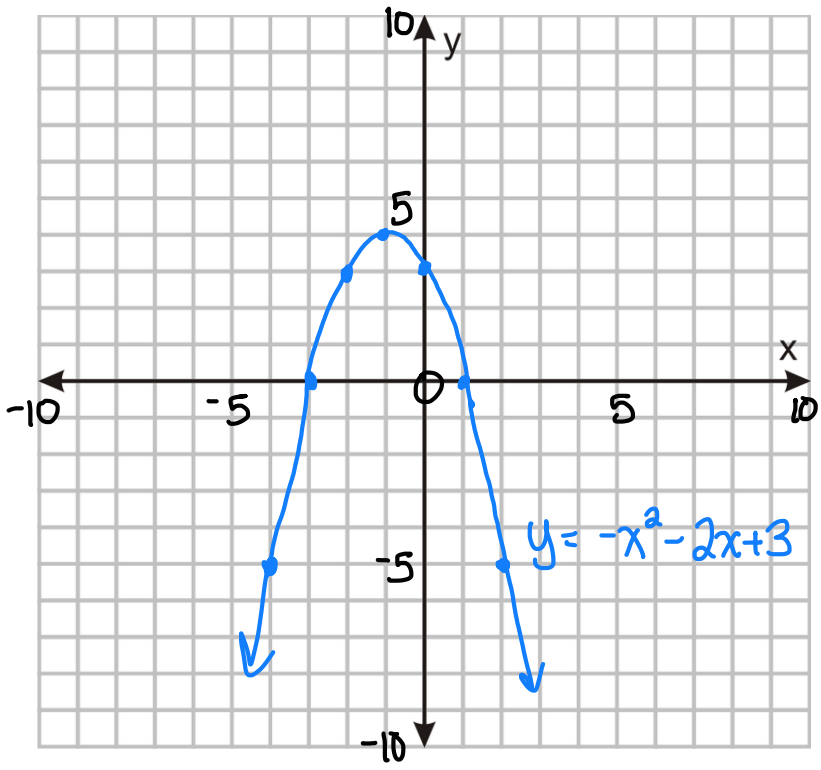


Graph the following quadratic relation using integers on the interval $-4 \le x \le 2$. Then, find their second differences.

$y = ax^2 + bx + c$

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

x	y	1st diff.	2nd diff.
-4	-5		
		> 5	
-3	0		> -2
		> 3	
-2	3		> -2
		> 1	
-1	4		> -2
		> -1	
0	3		> -2
		> -3	
1	0		> -2
		> -5	
2	-5		



The second differences are constant, ∴ this relation/function is quadratic.

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

$y = -(-4)^2 - 2(-4) + 3$

$y = -16 - 2(-4) + 3$

$y = -16 + 8 + 3$

$y = -5$

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

$y = -(2)^2 - 2(2) + 3$

$y = -4 - 2(2) + 3$

$y = -4 - 4 + 3$

$y = -5$