

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

**Linear, Quadratic, Exponential Tables**

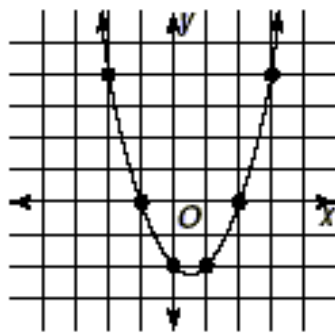
Quadratic functions have a unique characteristic... called a "common 2<sup>nd</sup> difference".

x	$y = x^2$	difference of y-values	difference of differences
0	0	$1 - 0 = 1$	$3 - 1 = 2$
1	1	$4 - 1 = 3$	
2	4	$9 - 4 = 5$	
3	9	$16 - 9 = 7$	
4	16	$25 - 16 = 9$	
5	25	$36 - 25 = 11$	

x	y
-1	16
0	2
1	-2
2	4
3	20
4	46

$-14$   
 $-4$   
 $+6$   
 $+16$   
 $+26$

x	$y = x^2 - x - 2$
-2	4
-1	0
0	-2
1	-2
2	0
3	4



Recall linear functions have a constant rate of change (a common difference).

x	-2	-1	0	1	2	3	4
y	5	7	9	11	13	15	17



Recall exponential functions have a common ratio.

	X	Y	
+1	-2	2	} x 3
+1	-1	6	
+1	0	18	
+1	1	54	
+1	2	162	

**Problems**

Based on the difference in  $y$ -values, identify the graph as linear, quadratic, exponential, or neither.

1.

$x$	-3	-2	-1	0	1	2	3
$y$	14	10	6	2	-2	-6	-10

2.

$x$	-3	-2	-1	0	1	2	3
$y$	$\frac{1}{2}$	1	2	4	8	16	32

3.

$x$	-3	-2	-1	0	1	2	3
$y$	21	12	5	0	-3	-4	-3

4.

$x$	-3	-2	-1	0	1	2	3
$y$	-16	-13	-10	-7	-4	-1	2

5.

$x$	-3	-2	-1	0	1	2	3
$y$	-14	-9	-4	1	6	11	16

6.

$x$	-3	-2	-1	0	1	2	3
$y$	-18	-6	-2	0	2	6	18

7.

$x$	-3	-2	-1	0	1	2	3
$y$	4	8	16	32	64	128	256

8.

$x$	-3	-2	-1	0	1	2	3
$y$	$\frac{1}{27}$	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9	27

9.

$x$	-3	-2	-1	0	1	2	3
$y$	30	20	12	6	2	0	0

10.

$x$	-3	-2	-1	0	1	2	3
$y$	11	9	7	5	3	1	-1

11.

$x$	-3	-2	-1	0	1	2	3
$y$	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9	27	81

12.

$x$	-3	-2	-1	0	1	2	3
$y$	-27	-9	-3	0	3	9	27

13.

$x$	-3	-2	-1	0	1	2	3
$y$	0	5	8	9	8	5	0

14.

$x$	-3	-2	-1	0	1	2	3
$y$	3	0	-1	0	3	8	15

15.

$x$	-3	-2	-1	0	1	2	3
$y$	1	0	-1	-2	-1	0	1

16.

$x$	-3	-2	-1	0	1	2	3
$y$	$\frac{9}{8}$	$\frac{9}{4}$	$\frac{9}{2}$	9	18	36	72