

## Comparing Quadratic Functions to Other Functions

**Exponential functions** have a fixed number as the base and a variable number as the exponent.

Let's fill out the table to compare linear, quadratic and exponential functions over time.

x	Linear $y = 2x + 2$	Quadratic $y = x^2 + 2$	Exponential $y = 2^x$
0	2	2	1
1	4	3	2
2	6	6	4
3	8	11	8
4	10	18	16
5	12	25	32

★ **Conclusion** over a long period of time the Exponential function will exceed the value of the other functions.

6. Which statement BEST describes the comparison of the y-values for  $f(x)$  and  $g(x)$ ?

- A. The values of  $f(x)$  will always exceed the values of  $g(x)$ .
- B. The values of  $g(x)$  will always exceed the values of  $f(x)$ .
- C. The values of  $f(x)$  exceed the values of  $g(x)$  over the interval  $[0, 5]$ .
- D. The values of  $g(x)$  begin to exceed the values of  $f(x)$  within the interval  $[4, 5]$ .

x	f(x)	g(x)
0	0	-10
1	2	-9
2	4	-6
3	6	-1
4	8	6
5	10	16

Exceeds  
does not

7. Determine if the following sets of points or tables represent a linear, quadratic, or exponential function. Give a reason for your answer.

a.

x	y
0	3
1	6
2	12
3	24

Exponential  
 $y = 3(2)^x$

b.

x	y
-2	-10
-1	-8
0	-6
1	-4

Linear  
 $y = 2x - 6$

c.

x	y
0	2
1	6
2	12
3	20

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

d.

$\{(-2, 0), (-1, -3), (0, -4), (1, -3), (2, 0)\}$

Quadratic

$(x-0)^2 - 4$

e.

$$\left\{ \left( -2, -\frac{3}{4} \right), \left( -1, -\frac{3}{2} \right), (0, -3), (1, -6), (2, -12) \right\}$$

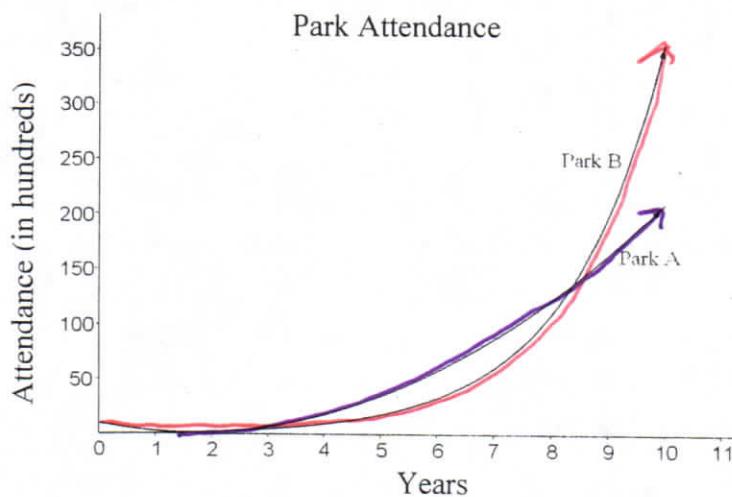
Exponential

$y = -3(2)^x$

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

Two nature parks opened the same year in neighboring towns. Park A's attendance can be represented by the equation  $y = 3x^2 - 10x + 10$ , and Park B's attendance can be represented by the equation  $y = 1.8^x - 1$ , where  $x$  represents the number of years since opening, and  $y$  represents the attendance in hundreds. Tables and graphs for both parks are shown below.

Year	Park A	Park B
1	3	0.8
2	2	2.2
3	7	4.8
4	18	9.5
5	35	17.9
6	58	33.0
7	87	66.2
8	122	109.2
9	163	197.4



1. In which years does Park A have the greater attendance?

$$[1, 8]$$

2. In which years does Park B have the greater attendance?

$$[9, \infty)$$

3. Describe how the functions are different.

A: Quadratic  $\rightarrow$   $y$  int 10

B: Exponential  $\rightarrow$   $y$  int Negative

4. If the trends continue, will Park A's attendance ever surpass Park B's attendance again? Explain.

No. Exponential functions always win