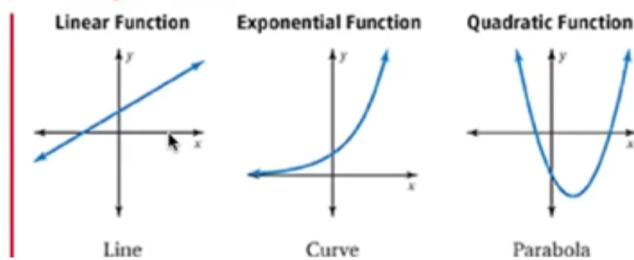


Comparing Linear, Exponential, and Quadratic Functions

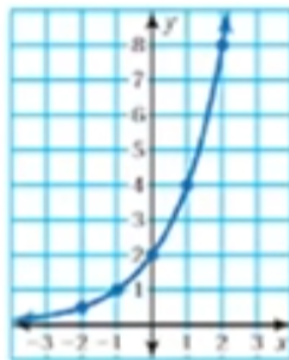
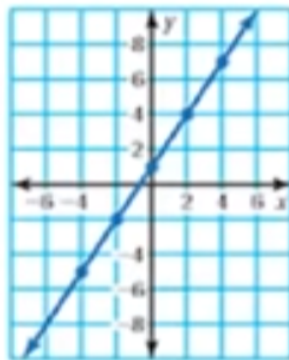
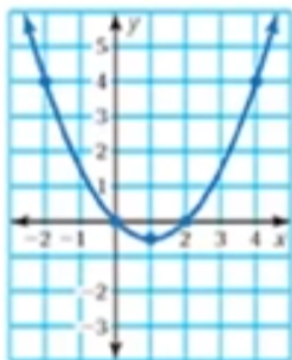
Key Idea



1 Identifying Functions Using Graphs

Plot the points. Tell whether the points represent a *linear*, an *exponential*, or a *quadratic* function.

- a. $(4, 4)$, $(2, 0)$, $(0, 0)$ b. $(0, 1)$, $(2, 4)$, $(4, 7)$ c. $(0, 2)$, $(2, 8)$, $(1, 4)$,
 $(1, -\frac{1}{2})$, $(-2, 4)$ $(-2, -2)$, $(-4, -5)$ $(-1, 1)$, $(-2, \frac{1}{2})$



Key Idea

Differences and Ratios of Functions

Linear Function: $y = 2x + 5$

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

$+1$ $+1$ $+1$ $+1$
 $+2$ $+2$ $+2$ $+2$

The y -values have a common difference of 2.

Exponential Function: $y = 4(2)^x$

x	-2	-1	0	1	2
y	1	2	4	8	16

$+1$ $+1$ $+1$ $+1$
 $\times 2$ $\times 2$ $\times 2$ $\times 2$

The y -values have a common ratio of 2.

Quadratic Function: $y = x^2 + 2x - 1$

x	-2	-1	0	1	2
y	-1	-2	-1	2	7

$+1$ $+1$ $+1$ $+1$
 First differences: -1 $+1$ $+3$ $+5$
 Second differences: $+2$ $+2$ $+2$

For quadratic functions, the second differences are constant.

2 Identifying Functions Using Differences or Ratios

Tell whether the table of values represents a *linear*, an *exponential*, or a *quadratic* function.

a.

x	-3	-2	-1	0	1
y	11	8	5	2	-1

$+1$ $+1$ $+1$ $+1$
 -3 -3 -3 -3

b.

x	-1	0	1	2	3
y	0	-1	2	9	20

$+1$ $+1$ $+1$ $+1$
 -1 $+3$ $+7$ $+11$
 $+4$ $+4$ $+4$