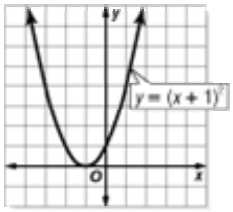
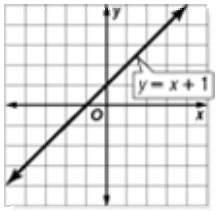
Lesson 10-1

Example 1 Identify Functions Using Graphs
Determine whether the graph represents a *linear* or *nonlinear* function. Explain.



The graph is a curve, not a straight line. So it represents a nonlinear function.

Example 2 Identify Functions Using Graphs
Determine whether the graph represents a *linear* or *nonlinear* function. Explain.



The graph is a straight line. So it represents a linear function.

Example 3 Identify Functions Using Equations
Determine whether $y = 2x + 1$ represents a *linear* or *nonlinear* function. Explain.

This equation is linear since it is of the form $y = mx + b$.

Example 4 Identify Functions Using Equations
Determine whether $y = x^2$ represents a *linear* or *nonlinear* function. Explain.

Since x is raised to the second power, the equation cannot be written in the form $y = mx + b$. So this function is nonlinear.

Example 5 Identify Functions Using Tables
Determine whether the table represents a *linear* or *nonlinear* function. Explain.

x	*y*
2	18
3	22
4	26
5	30

As *x* increases by 1, *y* increases by 4 each time. The rate of change is constant, so this function is linear.

Example 6 Identify Functions Using Tables
Determine whether the table represents a *linear* or *nonlinear* function. Explain.

x	*y*
2	5
3	10
4	17
5	26

As *x* increases by 1, *y* increases by a greater amount each time. The rate of change is not constant, so this function is nonlinear.

Example 7 Real-World Example
WORKING Use the table to determine whether the amount of pay is a linear function of the hours worked.

Hours	Pay
21	$105
23	$115
25	$125
27	$135
29	$145

Examine the differences between the amount of pay for each amount of hours worked.

$115 – $105 = $10 $125 – $115 = $10 $135 – $125 = $10 $145 – $135 = $10

Then examine the difference between the corresponding numbers of hours.

23 – 21 = 2 25 – 23 = 2 27 – 25 = 2 29 – 27 = 2

As the number of hours increases by 2, the amount of pay increases by $10 each time. The rate of change is constant, so this function is linear.