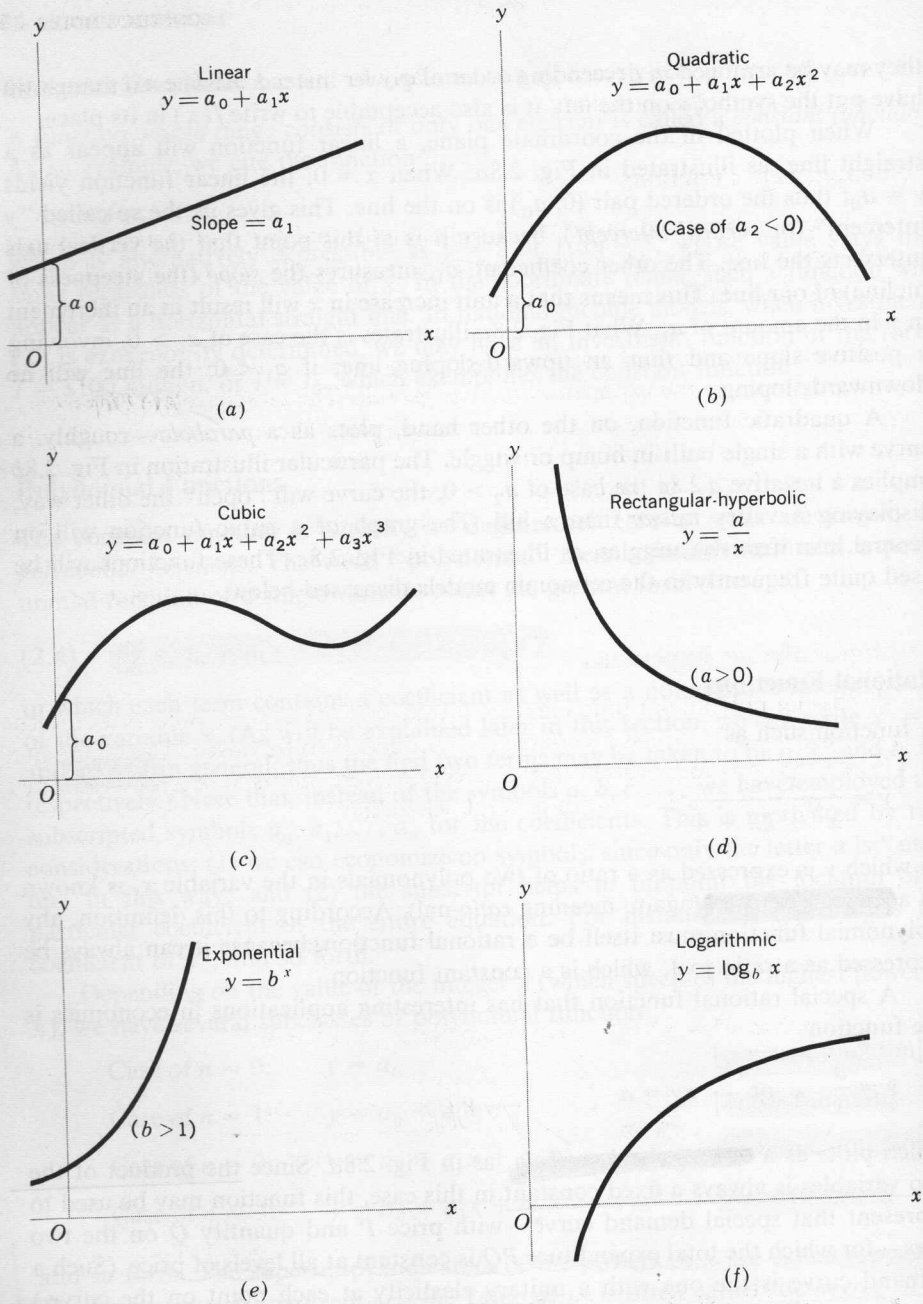
y
Linear
$y = a_0 + a_1 x$
Slope $= a_1$
a_0
O
x
(a)
y
Quadratic
$y = a_0 + a_1 x + a_2 x^2$
(Case of $a_2 < 0$)
a_0
O
x
(b)
y
Cubic
$y = a_0 + a_1 x + a_2 x^2 + a_3 x^3$
a_0
O
x
(c)
y
Rectangular-hyperbolic
$y = \frac{a}{x}$
$(a > 0)$
O
x
(d)
y
Exponential
$y = b^x$
$(b > 1)$
O
x
(e)
y
Logarithmic
$y = \log_b x$
O
x
(f)

Figure 2.8

2 Find some of the points on the graph of $g(x) = 2x - 1$, and sketch it.

Solution: One has $g(-1) = 2 \cdot (-1) - 1 = -3$, $g(0) = 2 \cdot 0 - 1 = -1$, and $g(1) = 2 \cdot 1 - 1 = 1$. Moreover, $g(2) = 3$. There are infinitely many points on the graph, so we cannot write them all down. In Fig. 4 the four points $(-1, -3)$, $(0, -1)$, $(1, 1)$, and $(2, 3)$ are marked off, and they seem to lie on a straight line. That line is the graph.

Some Important Graphs

Some special functions occur so often in applications that you should learn to recognize their graphs. You should in each case make a table of function values to confirm the form of these graphs.

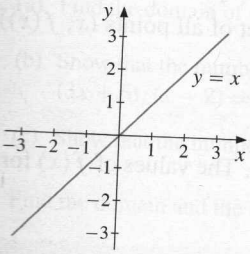

Figure 5 $y = x$

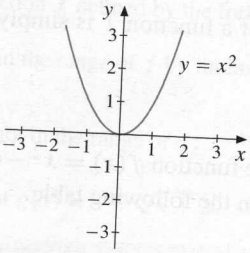

Figure 6 $y = x^2$

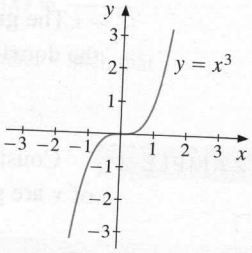

Figure 7 $y = x^3$

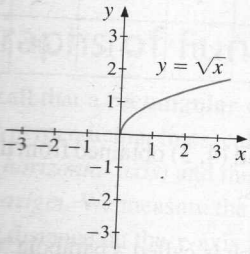

Figure 8 $y = \sqrt{x}$

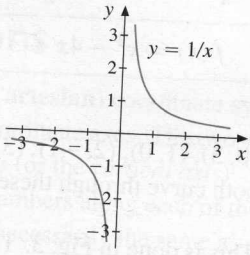

Figure 9 $y = 1/x$

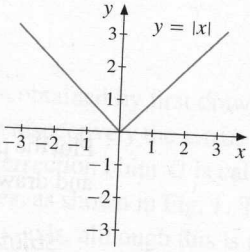

Figure 10 $y = |x|$

NOTE 1 When we try to plot the graph of a function, we must try to include a sufficient number of points, otherwise we might miss some of its important features. Actually, by merely plotting a finite set of points, we can never be entirely sure that there are no wiggles or bumps we have missed. For more complicated functions we have to use differential calculus to decide how many bumps and wiggles there are.