

17 It may be helpful to write  $f$  in standard form as follows:  $f(x) = -x^2 + 0x + 6$ .

(a) To find the vertex symbolically, use the vertex formula with  $a = -1$  and  $b = 0$ .

$$x = -\frac{b}{2a} = -\frac{0}{2(-1)} = \frac{0}{2} = 0. \text{ The } x\text{-coordinate of the vertex is } 0.$$

$$y = f\left(-\frac{b}{2a}\right) = f(0) = 6 - (0)^2 = 6. \text{ The } y\text{-coordinate of the vertex is } 6.$$

Thus the vertex is  $(0, 6)$ .

The graph of  $Y_1 = 6 - X^2$  shows graphical support for this vertex. See *Figure 17a*. A table with increment  $\Delta x = 0.1$  is shown as numerical support for this vertex. See *Figure 17b*.

$[-10, 10, 1]$  by  $[-10, 10, 1]$

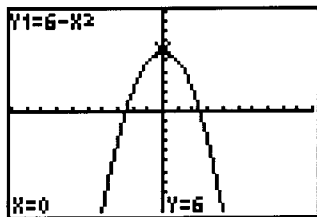


Figure 17a

X	Y1	
-.3000	5.9100	
-.2000	5.9600	
-.1000	5.9900	
0.0000	6.0000	
.10000	5.9900	
.20000	5.9600	
.30000	5.9100	

Y1 = 6 - X^2

Figure 17b

(b) The function is increasing for  $x \leq 0$  and decreasing for  $x \geq 0$ .