23 It may be helpful to write f in standard form as follows: $f(x) = -6x^2 - 3x + 1.5$.

(a) To find the vertex symbolically, use the vertex formula with $a = -6$ and $b = -3$.

$x = -\frac{b}{2a} = -\frac{(-3)}{2(-6)} = -\frac{3}{12} = -0.25$. The x-coordinate of the vertex is -0.25.

$y = f(-\frac{b}{2a}) = f(-0.25) = 1.5 - 3(-0.25) - 6(-0.25)^2 = 1.875$ The y-coordinate of the vertex is 1.875. Thus the vertex is $(-0.25, 1.875)$.

The graph of $Y_1 = 1.5 - 3X - 6X^2$ shows graphical support for this vertex. See *Figure 23a*. A table with increment $\Delta x = 0.05$ is shown as numerical support for this vertex. See *Figure 23b*.

$[-3, 3, 1]$ by $[-5, 5, 1]$

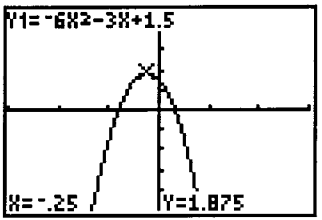

Figure 23a

X	Y1
-.4000	1.7400
-.3500	1.8150
-.3000	1.8600
-.2500	1.8750
-.2000	1.8600
-.1500	1.8150
-.1000	1.7400

Y1 = -6X^2-3X+1.5

Figure 23b

(b) The function is increasing for $x \leq -0.25$ and decreasing for $x \geq -0.25$.