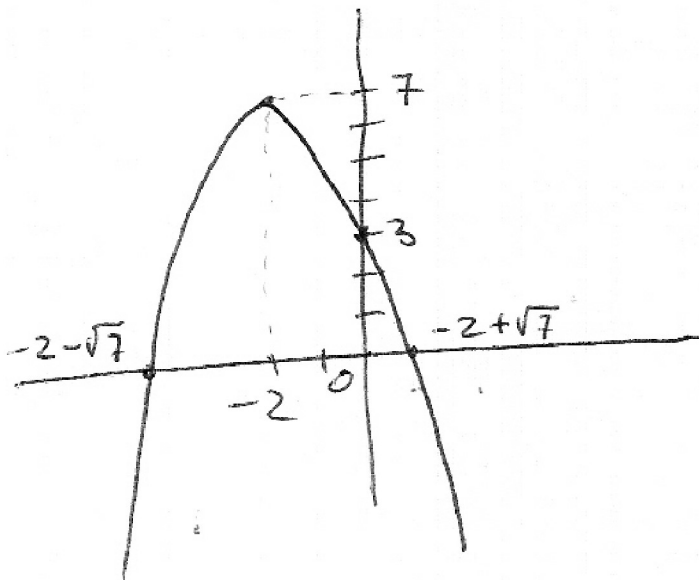


Problem 7: Consider the function $f(x) = 3 - 4x - x^2$. (a) Put it in normal form by completing the squares, (b) sketch its graph and carefully mark all the relevant points, (c) determine if it has a maximum value or a minimum value and if so compute it.

$$\begin{aligned} \text{(a)} \quad f(x) &= 3 - (x^2 + 4x) \\ &= 3 - [(x+2)^2 - 4] \\ &= 7 - (x+2)^2 \end{aligned}$$

(b)



$$\text{VERTEX} = (-2, 7)$$

$$\text{Y-INTERCEPT} = 3$$

$$\text{X-INTERCEPT} = -2 \pm \sqrt{7}$$

$$\text{(c)} \quad f \text{ HAS MAX VALUE} = \boxed{7}$$