1.2

$$|\psi\rangle = \alpha|0\rangle + \beta|1\rangle$$

a) $\langle\psi|\psi\rangle =$

$$\left(\alpha^*\langle 0| + \beta^*\langle 1|\right)\left(\alpha|0\rangle + \beta|1\rangle\right)$$

$$\langle\psi|\psi\rangle = \alpha^*\alpha\langle 0|0\rangle + \alpha^*\beta\langle 0|1\rangle + \beta^*\alpha\langle 1|0\rangle + \beta^*\beta\langle 1|1\rangle$$

$$\langle\psi|\psi\rangle = \alpha^*\alpha\langle 0|0\rangle + 0 + 0 + \beta^*\beta\langle 1|1\rangle$$

Recordar que

$$|\alpha|^2 = \alpha\alpha^*$$

$$|\beta|^2 = \beta\beta^*$$

$$\langle\psi|\psi\rangle = |\psi|^2 + |\beta|^2 = 1$$