

5) b)

$$A = \begin{bmatrix} 100 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$X = (1, 1, 1)$$

$$Y = (1, 1, 1)$$

(circled 1s with arrows pointing to 0s below)

$$X + Y = (2, 0, 0)$$

$$d(X+Y) = d(2, 0, 0) = \|(2, 0, 0)\|_A = \left\| A \begin{pmatrix} 2 \\ 0 \\ 0 \end{pmatrix} \right\|_2 = \|(200, 0, 0)\|_2 = 200$$

$$d(X) = d(1, 1, 1) = \|(1, 1, 1)\|_A = \|(0, 1, 1)\|_2 = \sqrt{2}, \quad d(Y) = d(1, 0, 0) = 100$$