

### Problem 3

ai)

$$a_{11} = q_1 \cdot k_1 = 1+2+3 = 6 \rightarrow a_{11}/\sqrt{k_1} = 6/2 = 3$$

$$a_{12} = q_1 \cdot k_2 = 0+0+0 = 0 \quad a_{12}/\sqrt{k_2} = 0/0 = 0$$

$$a_{13} = q_1 \cdot k_3 = 2+4+0 = 6 \quad a_{13}/\sqrt{k_3} = 6/2 = 3$$

ii) b)

$$a_{11} = \frac{a_{11}}{a_{11} + a_{12} + a_{13}} = \frac{6}{6} = \frac{1}{2}$$

$$a_{12} = \frac{0}{6} = 0$$

$$a_{13} = \frac{6}{6} = \frac{1}{2}$$

ai)

$$a_{11}/\sqrt{k_1} = 6/2 = 3$$

$$a_{12}/\sqrt{k_2} = 0/0 = 0$$

$$a_{13}/\sqrt{k_3} = 6/2 = 3$$

c)

$$z_1 = \{a_{1j} \mid j\}$$

$$= \frac{1}{2}(3, 0, 1) + 0 + \frac{1}{2}(1, 2, 2)$$

$$= (1, 5, 1, 5)$$