1.a

$$\|x\|_1 = \sum_{i=1}^{n} |x_i|$$

$$\|x\|_1 = |x_1| + |x_2| + |x_3| + \dots + |x_n| \geq 0 \quad \text{For } x \in \mathbb{R}^n$$

$$\|x\|_1 \geq 0 \quad \text{For } x \in \mathbb{R}^n \quad \& \quad \|x\|_1 = 0 \text{ IFF } x = 0$$

$$\& \quad \|x\|_1 = 0 \text{ IFF } x = 0 \quad \therefore$$

1.b

$$\|\lambda x\|_1 = |\lambda| \|x\|_1, \text{ For } \lambda \in \mathbb{R} \ \& \ x \in \mathbb{R}^n$$

$$\|\lambda x\|_1 = \sum_{i=1}^{n} |\lambda x_i| = |\lambda x_1| + |\lambda x_2| + \dots + |\lambda x_3| = \dots$$

$$\dots = \lambda \left(|x_1| + |x_2| + \dots + |x_n| \right) = |\lambda| \|x\|_1 \quad \therefore$$