Worksheet 2

(a)

$$L_2 = \sqrt{(1 - (-1))^2 + (1 - 1)^2 + (1 - (-1))^2 + (1 - 1)^2} = 2\sqrt{2}$$

(b)

$$L_1 = (1 - (-1)) + (1 - 1) + (1 - (-1)) + (1 - 1) = 4$$

(c)

$$L_\infty = 1 - (-1) = 2$$

2

(a)

$$\|x\|_1 = 1 + 2 + 3 + 4 = 10$$

(b)

$$\|x\|_2 = \sqrt{1^2 + 2^2 + 3^2 + 4^2} = \sqrt{30}$$

(c)

$$\|x\|_\infty = 4$$

3

(a)
ball

(b)
diamond

(c)
box

4

$(0, -1)$
$(-1, 0)$
$(0, 1)$
$(1, 0)$

5

(a)

not metric

(b)

metric

(c)

not metric