Foundations of Mathematics
Section 3.3

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3.3.4

a)

Here our partition $\mathcal{P}$ on $\mathbb{R}$ may be defined as the following

1. $\forall_{x\in[0,1)}\left(x \in P_x \in \mathcal{P}\right)$
2. $\forall_{P\in\mathcal{P}}\left(x \in P \implies (x+1 \in P \ and\ x-1 \in P)\right)$

c) Here our partition $\mathcal{P}$ on $\mathbb{R}$ may be defined as the following

1. $\forall_{x\in\left[-\frac{\pi}{2},\frac{\pi}{2}\right]}\left(x \in P_x \in \mathcal{P}\right)$
2. $\forall_{x\in\left(-\frac{\pi}{2},\frac{\pi}{2}\right)}\left(\pi - x \in P_x\right)$
3. $\forall_{P\in\mathcal{P}}\left(x \in P \implies (x+2\pi \in P \ and\ x-2\pi \in P)\right)$

d)

Here our partition $\mathcal{P}$ on $\mathbb{R}$ may be defined as the following

$$\forall_{x\in[0,\infty)}\left(\{-x,x\} \in \mathcal{P}\right)$$

e)

Here our partition $\mathcal{P}$ on $\mathbb{R}^2$ may be defined as the following

1. $\mathcal{P} = \{P_-, P_0, P_+\}$
2. $P_- = \left\{(x,y) \in \mathbb{R}^2 : xy < 0\right\}$
3. $P_0 = \left\{(x,y) \in \mathbb{R}^2 : xy = 0\right\}$
4. $P_+ = \left\{(x,y) \in \mathbb{R}^2 : xy > 0\right\}$

3.2.5

Here we define our partition $\mathcal{P}$ on $\{1, i, -1, -i\}$ as

$$\mathcal{P} = \{\{1,-1\},\{i,-i\}\}$$

3.2.6

Here we define our partition $\mathcal{P}$ on S^2 where $S = \{1, i, -1, -i\}$ as

$$\mathcal{P} = \left\{\left\{(x,y) \in S^2 : xy = s\right\} : s \in S\right\}$$

This may more clearly be defined as the following, the two are equivalent.

$$\forall_{s\in S}\left(\left\{(x,y) \in S^2 : xy = s\right\} \in \mathcal{P}\right)$$