

Math 4581 Chapter 4 solutions (Part I)

1.

 $6=6$ or $6=1+5=2+4=3+3$ or $6=1+1+4=1+2+3=2+2+2$ or $6=1+1+1+3=1+1+2+2$ or $6=1+1+1+1+2$ or $6=1+1+1+1+1+1$

so the possible π are (6) , $(1,5)$, $(2,4)$, $(3,3)$, $(1,1,4)$, $(1,2,3)$, $(2,2,2)$, $(1,1,1,3)$, $(1,1,2,2)$, $(1,1,1,1,2)$, $(1,1,1,1,1,1)$

examples of σ_π are (123456) , $(1)(23456)$, $(12)(3456)$, $(123)(456)$, $(1)(2)(3456)$, $(1)(23)(456)$, $(12)(34)(56)$, $(1)(2)(3)(456)$, $(1)(2)(34)(56)$, $(1)(2)(3)(4)(56)$, $(1)(2)(3)(4)(5)(6)$.

their powers are straightforward to compute (but messy to type), so are omitted.

their orders are 6, 5, 4, 3, 4, 6, 2, 3, 2, 2, 1.

3.

recall that $\rho=(1234)$, $\sigma=(123)(45)$, $\tau=(245)$. then

$$\rho\sigma=(1234)(123)(45)=(13245)$$

$$\sigma\rho=(123)(45)(1234)=(13542)$$

$$\sigma\tau=(123)(45)(245)=(1253)(4)$$

$$\tau\sigma=(245)(123)(45)=(1423)(5)$$

$$\rho\tau=(1234)(245)=(12)(345)$$

$$\tau\rho=(245)(1234)=(14)(235)$$

$$\rho\sigma\tau=(13245)(245)=(13254)$$

$$\rho\tau\sigma=(12)(345)(123)(45)=(1)(243)(5)$$

$$\sigma\rho\tau=(13542)(245)=(135)(2)(4)$$

$$\sigma\tau\rho=(1253)(4)(1234)=(15342)$$

$$\tau \circ \rho \circ \sigma = (14)(235)(123)(45) = (13425)$$

$$\tau \circ \sigma \circ \rho = (1423)(5)(1234) = (132)(4)(5)$$