

SOLUTIONS

slides 135-136

Slide 135

#7

$$\overline{\quad} \overline{\quad} \overline{\quad} \quad \therefore \quad 9 \times 8 \times 7 = 504 \text{ ways}$$

#8

8 people in 3 spaces $\binom{8}{3} \times 3! = 336 \text{ ways}$

#9

$$\overline{\quad} \overline{\quad} \overline{\quad} \overline{\quad} \overline{\quad} \overline{\quad} \overline{\quad} \overline{\quad} \quad \therefore \quad \binom{26}{2} \times 2! \times \binom{10}{4} \times 4! = 3276000$$

$26P_2 \times 10P_4$

#10

$$n P_{n-1} = \frac{n!}{(n-n+1)!} = \frac{n!}{1!} = \frac{n!}{1}$$
$$= \frac{n!}{0!} = \frac{n!}{(n-n)!} = n P_n$$

#12

8 people in 3 spaces

Gold Silver Bronte

if G: $1 \times 7 \times 6$; if S: $7 \times 1 \times 6 \Rightarrow$

$42 \times 2 = 84 \text{ ways.}$

#13. 18 people P S T ∴ $17 \times 17 \times 16 = 4624$

17 17 16

OR

if chosen for P: $1 \times \binom{17}{2} = 544$

if not chosen for P: $\binom{17}{3} \times 3! = 4080$.

∴ $4080 + 544 = 4624$ ways.

#14 ${}_n P_3 = {}_6 P_n$

$$\frac{(2n)!}{(2n-3)!} = \frac{6!}{(6-n)!}$$

$$\frac{2n(2n-1)(2n-2)\cancel{(2n-3)!}}{\cancel{(2n-3)!}} = \frac{6!}{(6-n)!}$$

$$2n(2n-1)(2n-2) = \frac{6!}{(6-n)!}$$

n has to be $n \leq 6$ and $n \geq 2$.

$n = 2, 3, 4, 5$ or 6 .

Test each then $n = 3$ or 5 .

#1 14 people, Joshua and Tolene together

$$13! \times 2! = 1.245 \times 10^{10}$$

#3 6 Bio 3 Phy

$$7! \times 3! = 30240$$

#6 5 Women 4 Male.

a) $4! \times 6! = 17280$

b) $4! \times 5! \times 2! = 5760$

c) Permute women $5!$

There are 6 gaps and 4 men

$$\binom{6}{4}$$

4 men arranged in $4!$ ways.

$$\therefore 5! \times {}^6C_4 \times 4! = 43200$$

d) $4! \times 5! = 2880.$