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CS-225: Discrete Structures in CS
Homework 8, Part 2

Exercise Set 9.5: Problem 7

B women=7
men=6
group = 4w & 3m

$\binom{6}{3} = \frac{6!}{3!(6-3)!} = \frac{6!}{3!3!} = \frac{6\times5\times4\times3!}{3\times2\times1\times3!} = 20$

$\binom{7}{3} = \frac{7!}{3!(7-3)} = \frac{7!}{3!4!} = \frac{7\times6\times5\times4!}{3\times2\times1\times4!} = 35$

$20\times35 = 700$ ANS

Exercise Set 9.5: Problem 16

A: $\binom{40}{5} = \frac{40!}{5!35!} = 658{,}008$

B: $\binom{37}{5} = \frac{37!}{5!(37-5)!} = \frac{37!}{32!5!} = 435{,}897$

37 = 40 - 3 (3 defective computers)

Exercise Set 9.6: Problem 4

A: r=30, n=8
$\binom{30+8-1}{30} = \binom{37}{30} = \frac{37!}{30!(37-30)!} = \frac{37!}{30!7!} = 10{,}295{,}472$

B:
r=30-4=26 n=8
$\binom{26+8-1}{26} = \binom{33}{26} = \frac{33!}{26!(33-26)!} = \frac{33!}{26!7!} = 4{,}272{,}048$

C:
ANS A - ANS B
$\frac{37!}{30!7!} - \frac{33!}{26!7!} = 10295472 - 4272048 = 6023424$

Exercise Set 9.6: Problem 12

$y_1+y_2+y_3+y_4 = 30$ y = positive integer
$y \geq 0,\ i=1,2,3,4$

$\binom{30+4-1}{30} = \binom{33}{30} = \frac{33!}{30!(33-30)!} = \frac{33!}{30!3!} = 5{,}456$

Exercise Set 9.6: Problem 18

$C(n,r) = \frac{n!}{r!(n-r)!} =$

A:
r=30, n=4

$\binom{30+4-1}{30} = \binom{33}{30} = \frac{33!}{30!(33-30)!} = \frac{33!}{30!3!} = 5{,}456$

B: n=4, r= 14 (30-16)

$\binom{14+4-1}{14} = \binom{17}{14} = \frac{17!}{14!(17-14)!} = \frac{17!}{14!3!} = 680$

C: r= 9 (30-21) n= 4

$\binom{9+4-1}{9} = \binom{12}{9} = \frac{12!}{9!(12-9)!} = \frac{12!}{9!3!} = 220$

D: Exclusion Rule $A_1 = 16$, $A_2 = 21$

$N(R_1 \cup R_2) = N(R_1) + N(R_2) - N(R_1 \cap R_2)$
$= 680 + 220 - 0$
$= 900$