



Combinations Ex 17.1 Q10

$${}^{n+2}C_8 \cdot {}^{n-2}P_4 = 57 : 16$$

$$\frac{\frac{(n+2)!}{8!(n-6)!}}{\frac{(n-2)!}{(n-6)!}} = \frac{57}{16}$$

$$\Rightarrow \frac{(n+2)(n+1)(n)(n-1)(n-2)!}{8!(n-2)!} = \frac{57}{16}$$

Cancelling  $(n-2)!$  from numerator and denominator

$$\Rightarrow (n+2)(n+1)(n)(n-1) = \frac{57 \times 7 \times 6 \times 5 \times 4 \times 3 \times 1 \times 16}{16}$$

$$\Rightarrow (n+2)(n+1)(n)(n-1) = 21 \times 20 \times 19 \times 18$$

comparing both sides  $n = 19$

Combinations Ex 17.1 Q11

$$\frac{\frac{28!}{(2r)!(28-2r)!}}{\frac{24!}{(2r-4)!(24-(2r-4))!}} = \frac{225}{11}$$

$$\Rightarrow \frac{28 \times 27 \times 26 \times 25 \times 24! (2r-4)!(28-2r)!}{(2r)!(28-2r)! 24!} = \frac{225}{11}$$

$$\Rightarrow \frac{28 \times 27 \times 26 \times 25}{2r \times (2r-1) \times (2r-2) \times (2r-3)} = \frac{225}{11}$$

$$\Rightarrow \frac{28 \times 27 \times 26 \times 25 \times 11}{15 \times 15} = 2r(2r-1)(2r-2)(2r-3)$$

$$\Rightarrow 11 \times 12 \times 13 \times 14 = 2r(2r-1)(2r-2)(2r-3)$$

Composing both sides  $r = 7$

Combinations Ex 17.1 Q12

$$\begin{aligned}
& \frac{\frac{4n!}{(2n)!(2n)!}}{\frac{2n!}{n!n!}} \left( \because {}^nC_r = \frac{n!}{r!(n-r)!} \right) \\
&= \frac{(4n)!}{(2n)!(2n)!} \times \frac{(n!)^2}{(2n)!^2} \\
&= \frac{[1.2.3.4 \dots (4n-1)(4n)](n!)^2}{(2n)! [1.2.3.4 \dots (2n-2)(2n-1)(2n)]^2} \\
&= \frac{[1.3.5 \dots (4n-1)] \times [2.4.6 \dots 4n] \times (n!)^2}{(2n)! [1.3.5 \dots (2n-1)]^2 \times [2.4.6 \dots (2n-2)(2n)]^2} \\
&= \frac{[1.3.5 \dots (4n-1)] \times 2^{2n} \times [1.2.3 \dots 2n] \times n!^2}{(2n)! \times [1.3.5 \dots (2n-1)]^2 \times 2^{2n} \times n!^2} \\
&= \frac{[1.3.5 \dots (4n-1)]}{[1.3.5 \dots (2n-1)]^2}
\end{aligned}$$

Hence Proved

Combinations Ex 17.1 Q13

$$\begin{aligned}
& \frac{\frac{2n!}{3!(2n-3)!}}{\frac{n!}{2!(n-2)!}} = \frac{44}{3} \\
\Rightarrow & \frac{2n! 2!(n-2)!}{3!(2n-3)!n!} = \frac{44}{3} \\
\Rightarrow & \frac{2n!}{3n! (n-1)(2n-3)!} = \frac{44}{3} \\
\Rightarrow & 2n(2n-1)(2n-2) = 44n(n-1) \\
\Rightarrow & (2n-1)(n-1) = 11(n-1) \\
& \text{Q } n = 6 \\
\therefore & n = 6
\end{aligned}$$

\*\*\*\*\* END \*\*\*\*\*