Permutations Ex 16.3 Q27

Total number of boys = 6

Total number of girls = 5

Now,

Five girls can sit on chairs in a row in ${}^{5}P_{5} = 5!$ ways.

and 6 boys can stand behind them in a row in ${}^{6}P_{6} = 6!$ ways.

Hence, the total number of ways

$= 5! \times 6!$

$= 5 \times 4 \times 3 \times 2 \times 1 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$

$= 120 \times 720$

$= 86400$

Permutations Ex 16.3 Q28

'a' denotes the number of permutations of $(x+2)$ things taken all at a time.

$\therefore a = {}^{x+2}P_{x+2}$

'b' is the number of permutations of x things taken 11 at a time.

$\therefore b = {}^{x}P_{11}$

and, C is the number of permutations of $x-11$ things taken all at a time.

$\therefore C = {}^{x-11}P_{x-11}$

Now,

$a = 182bc$ [given]

$\Rightarrow {}^{x+2}P_{x+2} = 182 \times {}^{x}P_{11} \times {}^{x-11}P_{x-11}$

$\Rightarrow (x+2)! = 182 \times \frac{x!}{(x-11)!} \times (x-11)!$ $\left[\because {}^{n}P_{n} = n! \text{ and } {}^{n}P_{r} = \frac{n!}{(n-r)!}\right]$

$\Rightarrow (x+2)! = 182 \times x!$

$\Rightarrow (x+2)(x+1)x! = 182 \times x!$

$\Rightarrow (x+2)(x+1) = 182$

$\Rightarrow x^2 + x + 2x + 2 = 182$

$\Rightarrow x^2 + 3x + 2 - 182 = 0$

$\Rightarrow x^2 + 3x - 180 = 0$

$\Rightarrow x^2 + 15x - 12x - 180 = 0$

$\Rightarrow x(x+15) - 12(x+15) = 0$

$\Rightarrow (x-12)(x+15) = 0$

$\Rightarrow x - 12 = 0$ $[\because x \neq -15]$

$\Rightarrow x = 12$

Hence, $x = 12$

Permutations Ex 16.3 Q29

There are 9 ways to pick the 1st digit.

For each of those 9 ways there are 8 ways to choose the second digit.
That's 9×8 or 72 ways to pick the first two digits.

For each of those 72 ways there are 7 ways to choose the third digit.
That's 72×7 ways or 504 ways to pick all three digits.

********** END **********