Combinations Ex 17.1 Q6

If ${}^{n}C_{p} = {}^{n}C_{q}$

$\Rightarrow \quad p + q = n$

also ${}^{x}C_{x} = {}^{18}C_{x+2}$

$\Rightarrow \quad x + x + 2 = 18$

$2x + 2 = 18$

$2x = 18 - 2 = 16$

$2x = 16$

$x = 8$

Combinations Ex 17.1 Q7

If ${}^{n}C_{p} = {}^{n}C_{q}$

Then $p + q = n$

$\Rightarrow \quad {}^{15}C_{3r} = {}^{15}C_{r+3}$

$\Rightarrow \quad 3r + r + 3 = 15$

$4r + 3 = 15$

$4r = 15 - 3 = 12$

$r = 3$

Combinations Ex 17.1 Q8

${}^{8}C_{r} = {}^{7}C_{2} + {}^{7}C_{3}$

Applying formula ${}^{n}C_{r} = \frac{n!}{r!(n-r)!}$

$$\frac{8!}{r!(8-r)!} = \frac{7!}{2!\,5!} + \frac{7!}{3!\,4!}$$

$$\frac{8\times 7!}{r!\,(8-r)!} = \frac{7!}{2\times 5\times 4!} + \frac{7!}{3\times 2\times 4!}$$

$$\frac{8\times 7!}{r!(8-r)!} = \frac{7!}{2\times 4!}\left(\frac{1}{5}+\frac{1}{3}\right)$$

Cancelling 7! from both sides

$$\frac{8}{r!\,(8-r)!} = \frac{8}{2\times 15\times 4!}$$

Cancelling 8 on both sides

$$2\times 5\times 3\times 4\times 3\times 2\times 1 = r!(8-r)!$$

$$(3\times 2)(5\times 4\times 3\times 2\times 1) = r!(8-r)!$$

$$\Rightarrow r! = 3!$$

$$r = 3$$

or $r! = 5!$

$r = 5$

Combinations Ex 17.1 Q9

$$\frac{\dfrac{15!}{(15-r)!\;r!}}{\dfrac{15!}{(15-r+1)!(r-1)!}} = \frac{11}{5}$$

$$\frac{\dfrac{15!}{(15-r)(16-r)!\;r(r-1)!}}{\dfrac{15!}{(16-r)!(r-1)!}} = \frac{11}{5}$$

$$\Rightarrow \quad \frac{16-r}{r} = \frac{11}{5}$$

$$80 - 5r = 11r$$

$$80 = 16r$$

$$r = \frac{80}{16}$$

$$= 5$$

$$r = 5$$

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