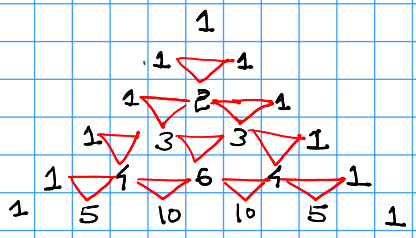

Pascal's triangle

permutation → "arrangements"
combination → "selections"

In a class of 10 students, how many ways can you select a pair of students?

$${}^{10}C_2 = \frac{10 \times 9}{1 \times 2} = 45$$

$${}^{n}C_r = \frac{n!}{(n-r)! \times r!}$$

You have a dollar, a quarter and a cent. In how many ways can I select the coins such that the total value is more than 100¢?

1) Q, D, C
2) C, D, Q
3) D, Q, C
4) Q, C, D
5) C, Q, D
6) Q, C, D

} 1 way

Q, D
C, D

$${}^{5}C_2 = \frac{5!}{(5-2)! \times 2!} = \frac{5!}{3! \times 2!}$$

$$= \frac{5 \times 4 \times 3!}{3! \times 2!}$$

$$= \frac{20}{2 \times 1} = 10$$

$${}^{3}C_3 = 1$$

$${}^{?}C_r = \frac{3!}{(3-3)! \times 3!}$$

$$= \frac{3!}{0! \times 3!} = \frac{1}{1} = 1$$

$${}^{5}C_3 = \frac{5 \times 4 \times 3!}{(5-3)! \times 3!} = \frac{20}{2} = 10$$

$${}^{3}C_1 = {}^{3}C_2 = \frac{3!}{(3-1)! \times 1!} = \frac{3!}{2! \times 1!} = \frac{3 \times 2!}{2! \times 1} = 3$$

$${}^{3}C_0 = {}^{3}C_3 = 1$$

$${}^{5}C_2 = {}^{5}C_3 = 10$$

$${}^{5}C_4 = {}^{5}C_1 = 5$$

$${}^{5}C_2 = \frac{5 \times 4}{1 \times 2} = 10$$

$${}^{5}C_3 = \frac{5 \times 4 \times 3}{1 \times 2 \times 3} = 10$$

$${}^{3}C_1 = \frac{3}{1} = 3$$

$${}^{3}C_2 = \frac{3 \times 2}{1 \times 2} = 3$$

$${}^{4}C_2 = \frac{4 \times 3}{1 \times 2} = 6$$