

COMBINATIONS

- A COMBINATION IS A SELECTION OF OBJECTS
IN WHICH ORDER IS NOT IMPORTANT

- THE LOTTO 6/49 - 6 NUMBERS ARE DRAWN FROM
49. THE NUMBERS COULD BE DRAWN 17, 43, 8, 21, 16, 28
THE RESULTS ARE PRINTED 8, 16, 17, 21, 25, 43

FOR EASE OF COMPARISON.

COMBINATIONS

$${}^n C_r = \frac{n!}{(n-r)!r!} \Rightarrow \frac{49!}{(49-6)!6!} = 13,983,816$$

IE How many 3 AND permutations can be made

From A, D, JACK, QUEEN, KING, ACE OF SPADES?

How many combinations?

$$\begin{aligned} \text{SOLN} \quad n P_r &= {}^5 P_3 = \frac{5!}{(5-3)!} = \frac{5!}{2!} = 60 \end{aligned}$$

$$\begin{aligned} n C_r &= {}^5 C_3 = \frac{5!}{(5-3)! \cdot 3!} = \frac{5!}{2! \cdot 3!} = 10 \end{aligned}$$

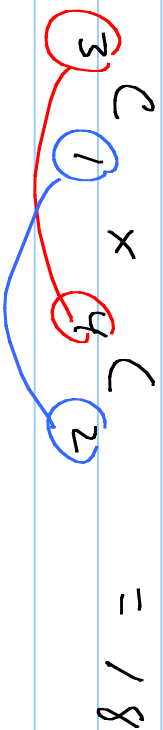
IE How many committees of 3 people from 7

Soln

$${}^7C_3 = 35$$

IE IF THE GROUP OF 7 CUSSETS OF 3 MALES AND 4 FEMALES, HOW MANY COMMITTEES OF 1 MALE 2 FEMALES.

Soln



$$= 18$$

IE STANDARDS DECK

A) HOW MANY 5 CARD HANDS CAN BE FORMED?

$$\text{Soln } {}_{52}C_5 = 2,598,960$$

b) How many with all hearts.

$${}^{13}C_5 \times {}^{39}C_0 = 1287$$

c) How many with all face cards

$${}^{12}C_5 = 792$$

d) 3 hearts and 2 spades?

$${}^{13}C_2 \times {}^{12}C_2 = 22,308$$

e) Exactly 3 hearts.

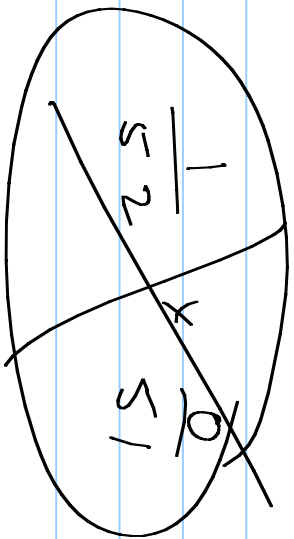
$${}^{13}C_3 \times {}^{39}C_2 = 211,924$$

f) At least 3 hearts

$${}^{13}C_3 \times {}^{39}C_2 + {}^{13}C_4 \times {}^{39}C_1 + {}^{13}C_5 \times {}^{39}C_0 = 241,098$$

$${}^{13}C_1 \times {}^4C_3 + {}^{12}C_1 \times {}^4C_2$$

SPACE BEARINGS & SPACE BEARINGS + NO SPACE () BEARING & SPACE BEARING



$$+ \frac{51}{52} \times \frac{1}{51} = \frac{1}{52}$$