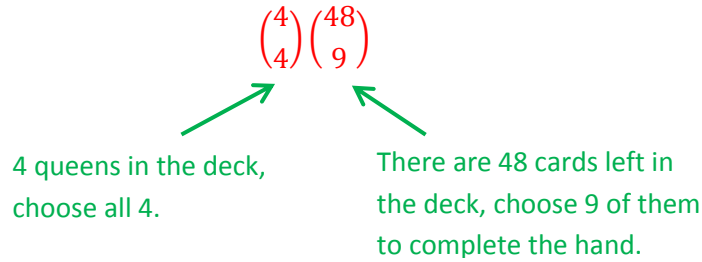


Please do not simplify answers!

1) A hand in hearts contains 13 random cards from a standard deck of cards. How many hands contain all four queens?



2) How many integer solutions are there to

$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 = 15$$

where  $x_i \geq 0$  and  $x_3 \geq 4$ ?

Use  $x'_3 = x_3 - 4$ , so that this problem becomes:

$$x_1 + x_2 + x'_3 + x_4 + x_5 + x_6 = 11$$

where  $x_i, x'_i \geq 0$ .

Using the stars and bars method, this has  $\binom{11+5}{5}$  solutions.

3) Alice will draw 7 cards out of a standard deck of cards. What is the probability that in her hand she has both a four of a kind and a three of a kind?

