

1.

$$nC_r = n! / r!(n-r)!$$

$$n = 250 \text{ and } r = 2.$$

$$250C_2 = 250! / 2!(250-2)! = (250 * 249) / 2 = 31,125$$

2.

$$5! / (3! * 2!) = 10$$

3.

$$2^3 = 8.$$

4.

$$nC_r = n! / r!(n-r)!$$

$$n = 30 \text{ and } r = 3.$$

$$30C_3 = 30! / 3!(30-3)! = (30 * 29 * 28) / (3 * 2 * 1) = 4,060$$

5.

$$nC_r = n! / r!(n-r)!$$

$$n = 6 \text{ and } r = 3.$$

$$6C_3 = 6! / 3!(6-3)! = (6 * 5 * 4) / (3 * 2 * 1) = 20$$

there are 20 ways to select 3 books out of 6

6.

The probability of rolling a 7 with a pair of dice is $6/36 = 1/6$. the probability of not rolling a 7 in one try is $1 - 1/6 = 5/6$. The probability of not rolling a 7 in three tries is $(5/6)^3 = 0.58$. Therefore, the probability of rolling at least one 7 in three tries is $1 - 0.58 = 0.42$ or 42%.

7.

$$2C_1 * 4C_2 = 2 * 6 = 12, \dots, 4C_3 = 4 \text{ the total number, is } 12 + 4 = 16$$

8.

a)

$$C(2,1) * C(2,1) * C(2,1) * C(2,1) * C(2,1) * C(10,5) * C(15,9)$$

$$C(2,1) = 2, C(10,5) = 252, \text{ and } C(15,9) = 5005$$

$$2 * 2 * 2 * 2 * 2 * 252 * 5005 = 50,269,760$$

(b)

$$C(2,2) * C(2,2) * C(2,2) * C(2,2) * C(2,2) * C(15,4)$$

$$C(2,2) = 1 \text{ and } C(15,4) = 1365.$$

$$1 * 1 * 1 * 1 * 1 * 1365 = 1365$$