

# Solutions

6. You receive requests to connect with people every day on your social media account. If you have 15 requests to be "friends" with people, in how many ways could you respond by either accepting or rejecting each request?

15 friend requests.  
You either accept all, some, or none of them.

$\Rightarrow 2^{15} = 32,768$  ways to respond

accept or reject (2 options)

number of requests

We don't subtract 1 because we could choose to accept none of them.

7. Tonya has the following toppings available for her sandwich: lettuce, tomatoes, onions, olives, sprouts, peppers, mustard, and shredded cheese. She can use up to three toppings. How many different sandwiches can Tonya make?

8 toppings available.

Can use up to 3.

Must have at least one!

$$\begin{aligned} \Rightarrow & 8C_1 + 8C_2 + 8C_3 \\ & = 8 + 28 + 56 \\ & = 92 \text{ different sandwiches} \end{aligned}$$

8. Rohan is shopping for new pants. Six different styles are available. How many different purchases could Rohan make?

6 styles available.

He has to purchase at least one pair.

For each style Rohan can buy/not buy

Using the indirect method

$$\begin{aligned} \Rightarrow & 2^6 - 1 \\ & \begin{array}{l} \swarrow \quad \uparrow \\ \text{buy/not buy} \quad \text{number} \\ \text{(2 options)} \quad \text{of styles} \end{array} \\ & \quad \quad \quad \leftarrow \text{remove the null set.} \\ & \quad \quad \quad \text{He has to purchase} \\ & \quad \quad \quad \text{at least one pair.} \\ & = 64 - 1 \\ & = 63 \text{ different purchases} \end{aligned}$$

10. A board of directors needs to assign a chair, vice chair, treasurer, secretary and communications officer. There are four women and six men on the board. There will be two women and three men on the executive. In how many ways could this be done?

First choose the executive

$$\begin{array}{ccc} 4C_2 \times 6C_3 & = & 6 \times 20 \\ \begin{array}{c} / \\ \text{women} \end{array} & \begin{array}{c} | \\ \text{men} \end{array} & = 120 \text{ ways} \end{array}$$

Secondly assign the positions  
There are 5 positions  $\Rightarrow$  5! arrangements

$$\begin{array}{l} \text{Total arrangements} = 120 \times 5! \\ \text{of the executive} = 14,400 \text{ arrangements} \end{array}$$