

## The problem

There is a randomly generated three-panel comic, with 74000 possible combinations.<sup>1</sup> How many images are there to randomly select from?

## The Solution

It is easy to go the other way — If you have  $n$  images, and you want to find out how many combinations of 3 panels there are, you can simply use the following formula:

$$\binom{n}{r} = \frac{n!}{r!(n-r)!} \quad (1)$$

So, if we have  $r = 3$ , and

$$\binom{n}{3} = 74000, \quad (2)$$

then

$$\frac{n!}{3!(n-3)!} = 74000 \quad (3)$$

$$\frac{n(n-1)(n-2)\cancel{(n-3)!}}{3!\cancel{(n-3)!}} = 74000 \quad (4)$$

$$n(n-1)(n-2) = 444000 \quad (5)$$

$$n^3 - 3n^2 + 2n - 444000 = 0. \quad (6)$$

Solving for  $n$  using a computer<sup>2</sup> gives

$$n = 77.2932056177889. \quad (7)$$

So, there are probably around 77 panels available for the random comic.

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<sup>1</sup><http://pandyland.net/random/>

<sup>2</sup>[http://www.sympygamma.com/input/?i=solve%28n\\*\\*3+-+3\\*n\\*\\*2+%2B+2\\*n+-+444000%2C+n%29](http://www.sympygamma.com/input/?i=solve%28n**3+-+3*n**2+%2B+2*n+-+444000%2C+n%29)