Soon after take-off, the pilot on an Eastern Airlines flight from Miami noticed a low pressure light for one of the three engines. Moments later, the other two engines had the same warning. All three engines lost power. The jet returned safely to Miami because the pilot was able to restart one of the engines.

What's the probability that all three engines fail at the same time, assuming the engines are independent?

The chances are 1 out of a trillion!!

Do you think the engines were independent?

They investigated and found that a mechanic was doing maintenance and made the same mistake on all three engines.

Since then, the airlines have different mechanics working on the engines of a plane to ensure this will not happen again.

The Rock'n'Roller Coaster at Disney has two seats in each of 12 rows. How many times must you ride in order to have at least a 95% chance of getting the first row seat at least once?

$P(\text{at least 1 front row}) = 1 - P(\text{no front row})$

$.95 = 1 - \left(\frac{11}{12}\right)^n$

$-1 \quad -1$

$-.05 = -\left(\frac{11}{12}\right)^n$

$\log .05 = \log\left(\frac{11}{12}\right)^n$

$\log a^b = b \log a$

$\log(.05) = n \log\left(\frac{11}{12}\right)$

$\frac{\log(.05)}{\log\left(\frac{11}{12}\right)} = n$

35 times

$34.4 = n$

The Leviathan roller coaster at Canada's Wonderland has four seats in each of 8 rows.

How many times must you ride to have at least a 95% chance of riding in the front row at least once?

$.95 = 1 - P(\text{not front row})$

$.95 = 1 - \left(\frac{7}{8}\right)^n$ $\quad n = 23$

$.05 = \left(\frac{7}{8}\right)^n$