8.3 Permutations of Identical Objects

Note Title 20/12/2012

You have a test coming up with 15 multiple choice questions. The teacher tells you there will be 4 A answers, 3 B answers, 2 C's, 4 D's and 2 E's. Is this helpful? How many answer keys are possible?

AAAABBBCCDDDDEE

4! 3! 2! 4! 2!

$$\frac{15!}{(4!3!2!4!2!)}$$

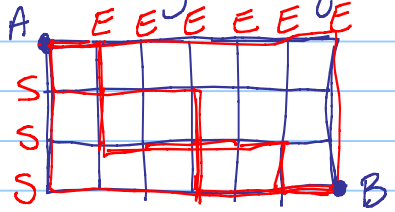
$$= 94,594,500$$

How many arrangements of the word MISSISSIPPI?

total number → $\frac{11!}{4!4!2!} = \frac{11\times10\times9\times\cancel{8}\times7\times\cancel{6}\times5}{\cancel{4}\times3\times\cancel{2}\times\cancel{2}}$

$$= 34650$$

How many ways to get from A to B if you can only move East and South?

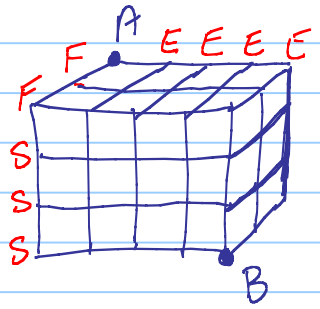


EEEEEEESSS

9 letters

$$\frac{9!}{6!3!} = \frac{\overset{3}{\cancel{9}}\times\overset{4}{\cancel{8}}\times7}{\cancel{3}\times\cancel{2}}$$

$$= 84$$



$$\frac{9!}{3!2!4!} = \frac{9\times 8\times 7\times 6\times 5}{6\times 2} = 1260$$