↳ Same # of heads and tails

O O O O O O O O

$\binom{8}{4}$

(22) ABCDEFGH

ED

permutation — cannot repeat letter.

* A , B , C , ED , F , G , H

7!

O O O O O O O

$7 \times 6 \times 5 \ldots \times 1 = 7!$

↳ BA and FGH?

BA , C , D , E , FGH

O O O O O

$5 \times 4 \times 3 \times 2 \times 1 =$

Recitation class NOV. 25, 2014

Q.1 $\ell = 6$

(P) O O O O O O

2 2 2 2 2 2 2^6

$\ell = 5$ O O O O O $= 2^5$

O O O O $= 2^4$

O O O $= 2^3$

O O $= 2^2$

O $= 2^1$

$$\underbrace{\sum_{i=1}^{6} 2^i}$$

But this answer is enough'

$$\sum_{i=1}^{n} 2^i = 2^{n+1} - 2$$

$\hookrightarrow 2^7 - 2 = 126$

(K1) ① $\underbrace{O O \ldots O}_{n-2}$ ① $= 2^{n-2}$

(16) O O O O

x 26 26 26

O ⊗ O O

O O ⊗ O

O O O ⊗

3

$$4 + 4 \times 25^3 + \binom{4}{2} \times 25^2 + \binom{4}{3} \times 25$$

solution.

si te dice que sea solo <u>una</u> x por cada string entonces:

⊗ O O O 25^3

O ⊗ O O 25^3

O O ⊗ O 25^3

O O O ⊗ 25^3

$4 \times 25^3 =$

(24) 1000 — 9999

9 | x ?

1×9

2×9

3×9

⋮

$1111 \times 9 = 9999$

$111 \times 9 = 999$

so exclude #s that r less than 111.

then → ∴ $1111 - 111$

↳ how many #s inbetween
1000 – 9999 are even?

$9999 - 1000 + 1 = 9000 \div 2 = \boxed{4500}$

↳ how many have distinct digits

$\bigcirc\ \bigcirc\ \bigcirc\ \bigcirc$
$9 \times 9 \times 8 \times 7 = 4{,}536$

↳ how many are not divisible by 3?

$3 \times 333 = 999$

then subtract from total

$3 \times 3333 = 9999$

↳ divisible by 5 or 7

$A = \{x \mid 1000 \le x \le 9999, 5 \mid x\}$

$9999 \div 5 = 1999$

$1999 - 200 + 1 = 1800 : |A|$

$1000 \div 5 = 200$

$$7\overline{)9999} = 1428$$
$$7\overline{)1000} = 142$$
$1428 - 142 = 1286 : |B|$

$B = \{x \mid 1000 \le x \le 9999, 7 \mid x\}$

* Now, $|A \cup B| = |A| + |B| - |A \cap B|$

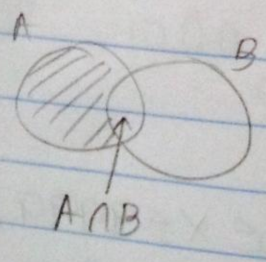
$|A \cup B| = 1800 + 1286 - 257 = 2829$

→ Not divisible by either 5 or 7

$\overline{A} \cup \overline{B} = \overline{A \cup B} \rightarrow 9000 - 257$

→ Not divisible by 5 but divisible by 7

$A \cap \overline{B} = A - B$



$|A| - |A \cap B| = |A \cap \overline{B}|$

$1800 - 257 = 1543$

6.2? How many diff. order can we write the governor's name?

—6
—5
—4
—3
—2
—1

O O O O O O

$6 \times 5 \times 4 \times 3 \times 2 \times 1 = 6!$

6.2

14 1—100, choose two posi integers.

$\overbrace{1 \ldots 99}$

$99-1+1=99$

$\binom{99}{2}$

18 O O O O O O O O coin exercise.

$2 \times 2 \times 2 \times 2 \times 2 \ldots \times 2 = 2^8$

H T H T H T ... T

↳ exactly two heads and rest tails

$\binom{8}{2} = \frac{8!}{6!\,2!} = \frac{8 \times 7}{2} = 28$

$2^8 - \cancel{37} = 256 \cancel{-37} = \cancel{219}$

6.4

⑧ $\underbrace{(3x}_{f} + \underbrace{2y}_{s})^{17}$ —— x^8y^9

$(f+s)^n = \binom{n}{0} f^0 s^n + \binom{n}{1} f^1 s^{n-1} + \binom{n}{2} f^2 s^{n-2} +$

$\dots + \binom{n}{n-1} f^{n-1} s^1$

$+ \binom{n}{n} f^n s^0$

answer: $\binom{17}{8}(3x)^8(2y)^9$

can put 8 or 9

$\underbrace{\binom{17}{8} 3^8 2^9}_{\text{coefficient}} x^8 y^9$

→ podemos dejarlo expresado.

6.4 prove this

(22) $\binom{n}{r}\binom{r}{k} = \binom{n}{k}\binom{n-k}{r-k}$

$$\left(\frac{n!}{r!(n-r)!}\right)\left(\frac{r!}{k!(r-k)!}\right) = \left(\frac{n!}{k!(n-k)!}\right)\left(\frac{(n-k)!}{(r-k)!(n-r)!}\right)$$

$$\frac{n!}{(n-r)!(k)!(r-k)!} = \frac{n!}{(n-r)!(k)!(r-k)!}$$

Another exercise.
→ Of 1st exam

$f: A \to B$

$S, T \subseteq A$

$\therefore f(S \cap T) \subseteq f(S) \cap f(T)$

$\wedge$ ↑ intersection

$x \in f(S \cap T) \to x \in f(S) \cap x \in f(T)$

$\to x \in f(S) \cap f(T)$

$y \in f(S \cap T) \to \exists x \in S \cap T, \; f(x) = y$

$x \in S \cap T \to x \in S \wedge x \in T$

$$\left.\begin{array}{l} x \in S \to f(x) \in f(S) \\ x \in T \to f(x) \in f(T) \end{array}\right\} \to f(x) \in f(S) \cap f(T)$$

$\to y \in f(S) \cap f(T)$

$\therefore f(S \cap T) \subseteq f(S) \cap f(T)$