HOMEWORK 3

Sunday, 9 November 2025 22:56

11) Bit strings start and end with 1 with length ten : 2^8

16) Strings with no letter x : 25^4
Total length-four strings : 26^4
Answer: $26^4 - 25^4$

24) a) $(9999 - 1008)/9 + 1 = 1000$
b) $9000/2 = 4500$
c) $9 \times 9 \times 8 \times 7 = 4536$
d) $9000 - 3000 = 6000$
e) $1800 + 1286 - 257 = 2829$
f) $9000 - 2829 = 6171$
g) $1800 - 257 = 1543$
h) 257

e), f), g), h): Related

26) a) $10!/(10-4)! = 5040$
b) $10^3 \times 5 = 5000$
c) $9 \times 4 = 36$

32) a) 26^8
b) $26!/(26-8)! = 26 \times \dots \times 19$
c) 26^7
d) $25!/(25-7)! = 25 \times \dots \times 19$
e) 26^6 (X_____X)
f) 26^6 (BO_____)
g) 26^4 BO____BO
h) $26^6 \times 2 - 26^4$ (BO_____ / _____BO)

37) a) If $n \leq 2$ then there are 2
If $n \geq 3$ then there are 0
b) $f(1) = 0$ and $f(n) = 0$
Answer: 2^{n-2}
c) $(n-1) \times 2$
Answer: $2(n-1)$

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4) a) 5
b) 13

9) $99 \times 50 + 1 = 4951$

15) $\{1;6\}$; $\{2;5\}$; $\{3;4\}$
Need at least 4 to make one pair

19) a)
Assume if each category has at most 8 students then the number of students would be:
$8 * 3 = 24$
However the number is 25
$\Rightarrow$ At least 9 of them are in the same category (sophomore, junior, senior)

b) Assume there are 2 freshmen, 18 sophomores and 4 juniors.
$4 + 2 + 18 = 24 < 25$.
Therefore one of the 3 must hold
≥ 3 freshmen
≥ 19 sophomores
≥ 4 juniors