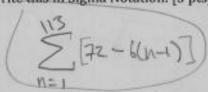
- 1. Simplify each expression to a single Fibonacci number. Show your work to receive full credit. [3 pts each]
- a) $2(F_1 + F_4 + F_7 + F_{10} + \dots + F_{334}) =$ 7F, +2Fy+2Fx+2Fx+...+2F324 B-F6+ F5-F2+F2-F2+F1-F2.11 + F\$35-F335+F336-F335 F336-F0 (F336)
- b) $F_{17} + 4F_{18} + 6F_{19} + 4F_{20} + F_{21} =$ 3F1x +7F19 + 4F20+F21 4Fig + 7Fz= +Fz1 3F20+5F21 25, + 3F22 For + 2F23 F23+ FZ4 = [FZ5]
- Evaluate ("evaluate" means "give the value of". Your answer should be a single number). Show the work that you used to arrive at your answer. [3 pts]

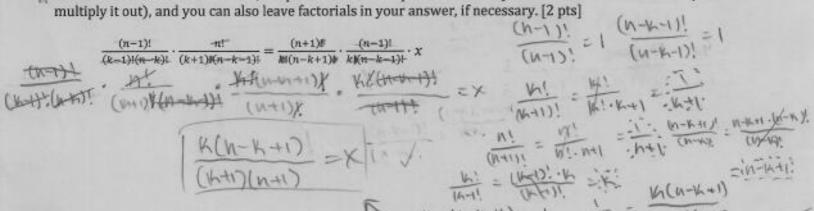
ed to arrive at your answer. [3 pts]
$$\sum_{5}^{\infty} 1024 \left(\frac{1}{2}\right)^{n} \log_{2} 4\left(\frac{1}{2}\right)^{n} \log_{2} 4\left(\frac{1}{2}\right)^{n$$

3. Write this in Sigma Notation: [3 pts]



this in Sigma Notation: [3 pts] 72 + 66 + 60 + 54 + ... - 594 - 600 $\sum_{N=1}^{3} [72 - 6(N-1)] + \sum_{N=2}^{4} [$

4. Solve for x in terms of n and k, simplified as much as possible. Leave your answer in factored form (no need to multiply it out), and you can also leave factorials in your answer, if necessary. [2 pts]

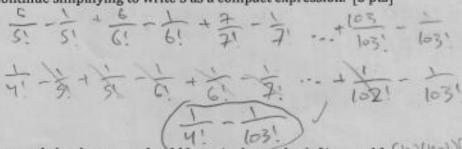


5. Consider the summation: $S = \frac{4}{5!} + \frac{5}{6!} + \frac{6}{7!} + \dots + \frac{102}{103!}$

We can use telescoping to write S as a compact expression if we replace the numerators like this:

$$S = \frac{5-1}{5!} + \frac{6-1}{6!} + \frac{7-1}{7!} + \dots + \frac{103-1}{103!}$$

Continue simplifying to write S as a compact expression. [3 pts]



- 6. Evaluate each (each answer should be a single number). [1 pt each] (h)(h-1)(h-2) . (h-1-1)
- a) $\binom{20}{3}$ $\binom{12}{15}$ b) $\binom{3}{4}$ $\binom{-2}{7}$ d) $\binom{12}{15}$ $\binom{15}{15}$ $\binom{15}{15}$
- 7. Prove using Mathematical Induction: [4 pts] " $11^n 6$ is divisible by 5 for all values of n > 0"

n=1 case: 11-6=5 1/5 dissite by 5

assume: 11-6=5 1/5 dissite by 5

Aore: 11-6=6 is dissible by 5

11-11-6

11-6+10-11*

(11-6)+(5.2.11*)

Ansitely 5 dissite by 5 in Chief land

1-0