Exercise 3.6.7

Introduction to Discrete Mathematics
MATH 2001

SEBASTIAN CASALAINA

ABSTRACT. This is Exercise 3.6.7 from Hammack [Ham13, §3.6]:

Exercise 3.6.7. Use the binomial theorem to show $\sum_{k=0}^{n} 3^k \binom{n}{k} = 4^n$.

Solution. The binomial theorem states that $(a+b)^n = \sum_{k=0}^{n} \binom{n}{k} a^{n-k} b^k$. If we apply this with $a = 1$ and $b = 3$, then we have

$$4^n = (1+3)^n = \sum_{k=0}^{n} \binom{n}{k} 1^{n-k} 3^k.$$

□

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REFERENCES

[Ham13] Richard Hammack, *Book of proof*, Creative Commons, 2013.

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