

MTH210 – SUBMISSION_20221110

TIME: 15 minutes

MARKS: 5

No consultation – open notes – **books and internet not allowed.** Marks will depend on the correctness and completeness of your answer. Any previous result used should be clearly referenced.

For $n \in \mathbb{Z}^+$, $n \geq 1$, prove the Binomial Theorem:

$$(1 + x)^n = \sum_{k=0}^n B(n,k) x^k$$

RUBRIC

List of Common Errors and Marks Deductions:

1. Using an undefined symbol.
2. Writing an equation in which the LHS and RHS are not comparable. For example, the LHS is a set, and the RHS is an integer.
3. Writing a meaningless or completely illogical statement.

Deduct 0.5 marks for each occurrence of an error of the above type. **However, the total marks for the submission should remain non-negative. Since this is a proof-type question, above deductions to be applied strictly.**

Marks to be awarded as follows:

In case an inductive proof is presented:

For stating that PMI is being used → 0.5 marks

Base Case: → 1 mark.

NB: It has to be shown that the formula holds for $n = 1$.

Inductive Step: → 3.5 marks

NB: If the (IH) is not clearly stated, cut 1 mark. If Pascal's Identity has not been explicitly referenced, but is simply used on the way, cut 1 mark.

Remark: If a completely different approach is adopted, consult the instructor. .