

Mathematical Methods of Physics 116A- Winter 2018

Physics 116A

Home Work # 2

Posted on Jan 18, 2018

Due in Class Jan 25, 2018

§Required Problems: Each problem has 10 points

E.g. MB 19.16 means problem #16 on page 19 in the book by M. Boas, 3rd Edition.

1. A crate containing N oranges in a large tray arrives at your door. You would like to pick out M oranges from the tray, for sharing with friends. Let R be the number of ways you make the choice.

Show that $R = {}^N C_M$, where ${}^N C_M = \frac{N!}{M!(N-M)!}$ is the binomial function encountered in class.

{ Hint: Start with small numbers, say $N = 5, M = 1$ and then $N = 5, M = 2$ and then generalize. }

2. Using the general Maclaurin series formula, expand out

$$(1+x)^\alpha = \sum_j x^j A_j$$

to order $j = 5$ for arbitrary α and verify the formula given in class for this expansion. Also verify that for $\alpha = 4$ the series truncates at x^4 .

3. MB 40.6
4. MB 41.12
5. MB 41.14
6. MB 41.18
7. MB 42.29
8. MB 45.12
9. MB 45.23
10. MB 52.11, 52.12

§Recommended Supplementary problems: No scores

S(1) MB 51. 1-9

S(2) MB 52. 1-8