MAE113 DISCRETE TECHNIQUES FOR COMPUTING

Coursework 8–to be handed in by noon, Wednesday 01/12/2010.

Write your name and student number at the top of your assignment before handing it in. You should attempt all questions because as little as one question might be marked.

1. Evaluate the following:

   (a) $C(7,5)$,

   (b) $P(6,4)$,

   (c) $C(100,2)$,

   (d) $P(8,5)$.

2. Using the *binomial formula*, calculate:

   (a) $(x+y)^6$;

   (b) $(a+b)^7$.

   Hint: you might use Pascal's triangle!

3. (a) In how many ways can the letters of the word APPLE be rearranged?

   (b) In how many of the above are the letters A and E next to one another (in any order)?

   (c) In how many ways can the letters of the word RASPBERRYTART be rearranged?

   (d) How many of these both begin and end with an R?

4. (a) Find the coefficient of x^3y^4z in the polynomial $(x+y+z)^8$

   (b) Find the coefficient of $x^2y^3z^4$ in the polynomial $(x+y^3+z^2)^5$

   (c) For what value of n is the coefficient of $w^7x^8y^{10}z^{14}$ in the polynomial $(w+x^2+y^2+z^2)^n$ not zero? Explain your answer.

5. In how many different ways can we distribute 5 vanilla, 3 chocolate and 4 strawberry flavoured ice-creams between 12 children?