School of Mathematics – Homework Feedback Form

Unit: Multivariable Calculus	Week/Problem Sheet: 2
Lecturer: Richard Porter	Set questions: 4, 7, 8
Marker: Zohar Neu	

General Comments

Please list and comment on those aspects which students found easy:

Please list and comment on those aspects which students found hard:

Please provide detailed feedback below, using a separate box for each set question, indicating:

- **Parts that most students were able to complete correctly.**
- **Parts that some students were able to complete correctly but some students found difficult, with a further indication of where they might find an outline of the correct method of solution.**
- **Parts that many students were unable to complete correctly and any general reasons why they all went wrong.**

Question 4

Majority of students did not use suffix notation to do this question, leading to over-complicated and often incorrect algebraic manipulation.

Those who did use the notation found the question easier, but mistakes were occasionally made. Namely in (b) there was some confusion over how to define **r**, which many defined as (r_1, r_2, r_3). This lead to some confusion when the derivative was taken with respect to x_i variables. Often only one derivative was taken of r^n instead of two.

In (c) many did not know how to deal with partial derivatives of x_i with respect to x_j and x_i, often not realising that these lead to Kronecker deltas.

Question 7

Most students did not give an answer for why the equation given was false without calculation. The majority did, however, then provide the correct result, but often it was simply quoted or found using the 'BAC-CAB' rule rather than derived using suffix notation.

A common mistake was to end up with minus sign on the wrong term, often due to confusion over the sign change of the Levi-Civita Tensor when its suffixes were interchanged.

Question 8

Surprisingly this question was completed well by most of the students, even those that did not do questions 4 and 7 correctly.

That said, some of the students quoted the 'BAC-CAB' rule in their answer.