442 Tutorial Sheet 1[1]

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1. (1) Show that $T^{ab}S_b$ is a tensor, where T and S are tensors.
2. (1) Show that $T^{(ab)}V_{[a|c|b]}$ vanishes, where T and V are tensors.
3. (1) Show that $T^{ab}{}_e = T^{abc}{}_{de}\delta^d_c$ is a tensor.
4. (1) Show that $T^{ab} = -T^{ba}$ in one coördinate system implies that $T^{a'b'} = -T^{b'a'}$ in another coördinate system.
5. (2) Write $\triangle f$ in polar coordinates.
6. (3) Show that torsion is a tensor.
7. (3) Find the transformation law for detg_{ab}.
8. (2) Show that $D_a g^{bc} = 0$ for a torsion free metric connection.

[1] Conor Houghton, houghton@maths.tcd.ie, see also http://www.maths.tcd.ie/~houghton/442.html