This week's tutorial will be centered on a review of complex numbers, Appendix A in the SPF book. Please go through this Appendix yourselves in thorough detail so that you understand all of this material. It will be needed so much throughout the course that it is vital that you be comfortable with it as soon as possible.

1. Use the power series expansion of $e^x, \cos x$ and $\sin x$ to justify the formulae [1]

$$\frac{de^x}{dx} = e^x$$

$$\frac{d\cos x}{dx} = -\sin x$$

and

$$\frac{d\sin x}{dx} = \cos x$$

2. (Exercise A.5) Prove the following identities are true:

$$\mathcal{R}e\{z\} = (z + z^*)/2$$

$$\mathcal{I}m\{z\} = (z - z^*)/2j$$

$$|z|^2 = zz^*$$

P-A.1 (a) and (c)

P-A.2 (a), (b), (c)

P-A.3 all

P-A.4 all

P-A.5 all

P-A.7 all

P-A.9

[1] Although this should reassure you that the power series expansions are correct and consistent with what you already know, there is a circularity in the argument here since we needed the derivatives in order to find the power series expansions in the *first place*.