Section 1: de Moivre's theorem

Crucial points

1. **Make sure you get the statement of de Moivre's theorem right**
   De Moivre's theorem says that $\left(\cos\theta + i\sin\theta\right)^n = \cos n\theta + i\sin n\theta$ for all integers n. It **does not** say, for example, that $\cos^n\theta + i\sin^n\theta = \cos n\theta + i\sin n\theta$ for all integers n. This is just one of numerous possible silly errors.

2. **Remember to deal with the modulus when using de Moivre's theorem to find a power of a complex number**
   For example in $\left[3\left(\cos\dfrac{\pi}{6} + i\sin\dfrac{\pi}{6}\right)\right]^5 = 3^5\left(\cos\dfrac{5\pi}{6} + i\sin\dfrac{5\pi}{6}\right)$, a common mistake is to forget to raise 3 to the power of 5.

3. **Make sure that you don't get the modulus of an nth root of a complex number wrong**
   Remember that $\left|z^n\right| = \left|z\right|^n$, and this applies not just to integer values of n, but includes rational values of n, as when taking roots of z.

4. **Make sure that you get the right number of nth roots of a complex number**
   There should be exactly n of them. Remember two complex numbers which have the same moduli and arguments which differ by a multiple of 2π are actually the same number.