Fusion categories and TQFT: Problem Set 0 Hints

1. (a) Compute τ^2, τ^3, τ^4, etc. until you see the pattern.

   (b) There are two ways to do it: you can either compute the Frobenius-Perron eigenvalue of the fusion matrix N_τ or use the fact that the Frobenius-Perron dimension function is a ring homomorphism.

2. Let's give the basis elements names, say $L = \{1, x, y\}$. If x is not self-dual, what are the possible choices of fusion rules for $x \otimes x$?

3. Should be straightforward to check the definition given on the problem sheet.

5. Like with Exercise 1 there are two ways to do it. If you want you can appeal to the fact that FPdim is a ring homomorphism but in my opinion this is not as enlightening as applying the definition. In the latter case one must observe that $N_{X \boxtimes Y} = N_X \otimes N_Y$. What can you say about the eigenvalues of $N_{X \boxtimes Y}$?

6. See Section 3.4 starting on page 56:
   `http://www-math.mit.edu/~etingof/egnobookfinal.pdf`