Reading assignment:

Read through the following lecture, which is mainly the classification of 1d oriented TFTs. You can and a different account in Freed, Bordism Old and New, Chapter 16.

Notation in Freed: $\Omega_n^{SO} = \Omega_n^{or}$

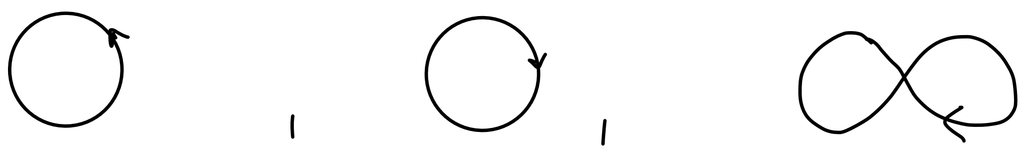
$\mathrm{Bord}^{SO}_{\dots} = \mathrm{Bord}^{or}_{\dots}$

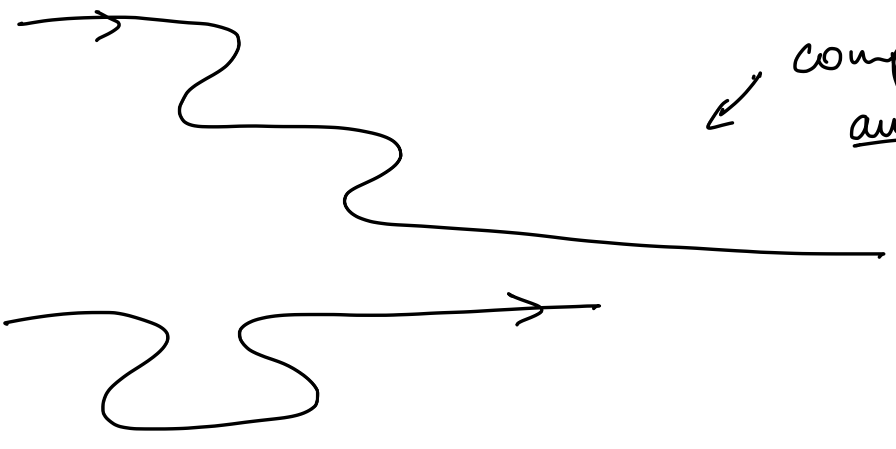
Questions to guide you through:

① Let $F : \mathcal{B} \longrightarrow \mathcal{C}$ be symmetric monoidal. If $M \in \mathcal{B}$ is dualizable, can we conclude that $F(M) \in \mathcal{C}$ is dualizable? What does this imply for TFTs?

② Let $Z : \mathrm{Bord}_1^{or} \longrightarrow (\mathrm{Vect}, \otimes)$ be a TFT associated to a finite dim'l vector space V.

What is the value of Z at





compute directly **and** using properties.

(3) What examples of natural transformations can you think of? Are they symmetric monoidal?

(4) Note that the classification thm states that we have an equivalence of <u>groupoids</u>.

But <u>why</u> is $TFT^{or}_{1,0}(\mathcal{C})$ a groupoid?

This is a general fact: any symmetric monoidal natural transformation between TFTs is invertible!

If you'd like to prove this, you should use that any object in $Bord^{or}_{n,n-1}$ is dualizable.

$Bord_{n,n-1}$

$\vdots$