1. Do ex. 1.3.3 from Weibel. Can you do this with the diagram calculus from Friday's class?

2. Show that ker is left exact and coker is right exact. Can you do this by chasing elements? Can you do this with the universal properties? Can you do this with the diagram calculus from Friday's class?

3. Make up examples to see that ker is not right exact and coker is not left exact.

4. In class we didn't prove the whole snake lemma. We constructed the connecting homomorphism and proved the exactness of the snake at the two positions adjacent to the connecting homomorphism. Finish the proof of the snake lemma by proving the exactness of the snake at the remaining positions. Can you do it with the diagram calculus?

5. Do ex. 1.3.5 from Weibel.

6. A function $F : C \to D$ between abelian categories is called *additive* if it preserves direct sums. There are two natural interpretations of exactly what this means. What are they? Prove that they are equivalent.

7. Suppose $F : C \to D$ is an additive functor between abelian categories. Show that, $F : \mathrm{Hom}(a, b) \to \mathrm{Hom}(Fa, Fb)$ is an abelian group homomorphism for all objects a and b in C. In other words, you should show that, for all maps $g, h : a \to b$ in C, we have $F(g + h) = F(g) + F(h)$ as maps $Fa \to Fb$.