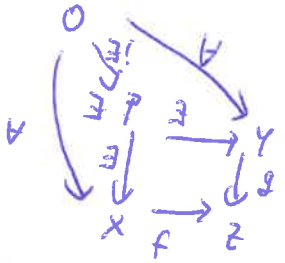
Pullback and pushout in other situations

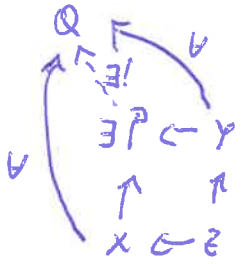
We have defined pullback and pushout for modules, but the definitions follow general principles and can be used in other situations.

Pullback:



- Suppose X, Y, Z are sets, f and g are set maps (functions). Is there a pullback P satisfying the properties indicated by the diagram?
- Suppose X, Y, Z are commutative rings, f and g are ring homomorphisms. Is there a pullback?

Pushout:



- Try again sets.

Does it make sense to look for kernels or cokernels of maps between sets?

(If you are familiar with topology, you may try to interpret the Seifert-van Kampen theorem as saying that certain pushouts are preserved.)