

## MATH 3200 – Learning objectives to meet for the final exam

The final exam is cumulative: **All of the material we have covered from the start of the semester up through our class on Nov 25 is potentially examinable.**

Please refer to the review sheets for Exams #1 and #2 (and the exams themselves) for guidance on past material. The learning outcomes below refer only to content covered after Exam #2.

### What to be able to state

#### Basic definitions

Be able to give concise, complete, and precise definitions of each of the following terms.

- function  $f: X \rightarrow Y$
- terminology associated to functions: domain, range, codomain, image, preimage
- one-to-one function (injective function)
- onto function (surjective function)
- bijection
- the composite function  $g \circ f$
- inverse function

### What to be able to do

You may be called on to perform any or all of the following tasks. Examples of all of these tasks can be found on the class worksheets.

- Recognize examples and non-examples of the concepts appearing in the “basic definitions” section above.
- Determine if a given relation on two sets represents a function.
- Determine the number of functions from a set  $A$  to a set  $B$ , possibly satisfying extra conditions (such as injectivity).
- Write proofs showcasing your ability to unwind and manipulate concepts associated with functions. See the proof problems on “HW” #7.

### What to expect on the final exam

You can expect 8–12 questions on the final exam. These will include:

- at least one problem assessing your negation skills
- a proof requiring you to use induction or strong induction

- at least one problem asking you to apply element chasing to establish a set equality or set containment
- at least one proof requiring the concept of one-to-one and/or onto

### **Extra practice problems**

See “HW” #7.