Math 215 – Fall 2017

Practice Homework 10 – Assigned October 12th, due October 16th

Note: Remember that you must show your work to get full credit for a problem.

1. Let p be a prime, and let $n \geq 2$ be an integer. Show that $\sqrt[n]{p}$ is irrational.

2. Suppose you have a 5 litre jug and a 7 litre jug. We can perform any of the following moves:

   a. Fill a jug completely with water.

   b. Transfer water from one jug to another, stopping if the other jug is filled.

   c. Empty a jug of water if it is completely filled. (we can't empty partially filled jugs)

   The goal is to end up with one jug having exactly 1 litre of water. How do we do this?

3. Let p be a prime, and let k and $n \geq 1$ be integers. Show that $p|k^n$ if and only if $p^n|k^n$.