

## *Discrete Math Exam Problem: Irrationals*

In class, we proved that  $\sqrt{2}$  is irrational. In fact,  $\sqrt{n}$  is always irrational whenever  $n$  is not a perfect square, though we won't be able to prove this until later in the course; for now you may assume it without proof.

- (a) Prove that the sum of a rational number and an irrational number must be irrational.
- (b) Prove that the product of a rational number and an irrational number must be irrational.
- (c) Give an example showing that it is possible for the sum of two irrational numbers to be rational.
- (d) Prove that  $\sqrt{2} + \sqrt{3}$  is irrational.

Remember to also upload a short video of yourself explaining your solution. Either visit <http://flipgrid.com/hdxdiscrete> and choose this problem from the list of problems, or go to the course website and click the FlipGrid logo next to this problem in the course calendar.