

Math 8: Rational and Irrational Numbers

Spring 2011; Helena McGahagan

1. Prove that $\sqrt{3}$ is irrational.

2. (a) Assume a is rational and b is irrational. What can you say about $a + b$? What about ab ?

(b) Come up with examples of a and b , both irrational, such that (i) $a + b$ is rational or (ii) ab is rational.

(c) If a is rational and $a \neq 0$, what can you say about b if you know that the product ab is rational?

3. See if you can come up with a proof of the fact that between every pair of real numbers $a < b$, there is an irrational number (without looking back at your book or notes!) Hint: You want to add something small to a (so that the result will still be less than b) and make sure that the result will be irrational. Consider the cases a is rational and a is irrational separately.