

Submit your typed answers to the questions below using the department's Gitlab server by October 2, 2015 @ 11:59pm. Put your PDF into a folder named `theory_assignment2`.

1. Prove that $m^2 = n^2$ if and only if $m = n$ or $m = -n$.
2. Show that these statements about the real number x are equivalent.
 - (a) x is rational
 - (b) $x/2$ is rational
 - (c) $3x - 1$ is rational.
3. Prove that these four statements about the integer n are equivalent.
 - (a) n^2 is odd.
 - (b) $1 - n$ is even.
 - (c) n^3 is odd.
 - (d) $n^2 + 1$ is even.
4. Prove or disprove that if a and b are rational numbers, then a^b is also rational.
5. Prove that between ever rational number and every irrational number there is an irrational number.