Guideline

Homework for week 05.

Should your response to an exercise be unreadable, full credit for that exercise will be deducted.

Exercise 1 (points = 40)

Determine if the following is true or false. Explanation is not needed.

1. rational/irrational is irrational.
2. Irrational*irrational is irrational.
3. The sum of any two positive irrational numbers is irrational.
4. The square root of any rational number is irrational.

Exercise 2 (points = 20)

We say an integer is a perfect square if it can be expressed as a square of some integer. For example, 81 is a perfect square; 80 is not.

Prove the following statement: there is a perfect square that can be written as a sum of two other perfect squares.

Hint: Consider using direct proof.

Exercise 3 (points = 20)

Suppose a and b are integers. Prove $a^2 - 4b \neq 2$.

Exercise 4 (points = 20)

Suppose x is a real number. Prove that if $x^3 - x > 0$ then $x > -1$.