

Tutorial #1: Hometask

Integers

Prove or disprove:

- 1) If $a \cdot b = a$, then $b = 1$
- 2) The difference of any two odd integers is even.

Prime numbers

- 1) Is $n^k - 1$ prime for any integers n and k ?
- 2) Is expression $n^2 - n + 41$ a prime number?

Divisibility

- 1) Prove that sum of $2n + 1$ consecutive numbers is divisible by $2n + 1$
- 2) Find quotient and divisor of:
 - a. $n^3 + 2n - 1$ divided by n ;
 - b. $12n^5 + 10n^4 + 2$ divided by $2n + 1$;

Rational numbers and Real numbers

Write each rational number as a ratio of two integers:

- $0.462716271\dots$
- $12.1121121\dots$

Prove or disprove :

- 1) If r is any rational number, then $3r^2 - 2r + 4$ is rational.
- 2) Product and sum of two rational numbers is rational.