

45th International Physics Olympiad

Astana, Kazakhstan

# Theoretical Competition, Tuesday, 15 July 2014

# List of fundamental constants

|  |  |
| --- | --- |
| Speed of light in vacuum |  |
| Gravitational constant |  |
| Free fall acceleration |  |
| Avogadro constant |  |
| Universal gas constant |  |
| Boltzmann constant |  |
| Elementary charge |  |
| Electron rest mass |  |
| Proton rest mass |  |
| Reduced Planck constant | *ћ* |
| Permittivity of vacuum |  |
| Permeability of vacuum |  |

**Useful mathematical formulas**

, where and being an arbitrary constant

, where

, where

, , with *C* being an arbitrary constant

, with *C* being an arbitrary constant