MSJ Math Club

MMT Answer Conventions and General Rules

MMT 2015

1 Materials Allowed

The following items are allowed for each round unless otherwise specified:

- Pencils
- Pens
- Erasers

In particular, calculators and drawing instruments are **not** allowed, nor will they be required. Scratch paper will be provided by MMT. If you wish to use other materials, ask your Math Club officers before the contest.

2 Conventions

2.1 Notation

- All angle measures written without a degree symbol ($^\circ$) are assumed to be in radians.
- Logs will be in base 10 unless otherwise specified. "ln" refers to the logarithm base e.
- Unless specified, the numerical base is decimal (base ten). All your answers must be in base ten, too, unless otherwise specified.
- The complex number i is stood for $\sqrt{-1}$.
- Combinations are written as $\binom{n}{r} = \frac{n!}{r!(n-r)!}$.
- *Lattice points* are coordinate points whose dimensions are all integers.
- A divisor or factor of an integer refers to positive integers only. A *proper* divisor are divisors that are less than the integer itself.
- Primes refer to positive primes only. Note that 1 is neither prime nor composite.
- $\text{Max}\{a_1, a_2, \cdots, a_n\}$ denotes the largest element in the set, and $\min\{a_1, a_2, \cdots, a_n\}$ denotes the smallest element in the set.
- Diagrams are not necessarily drawn to scale.

2.2 Answers

- All answers must be expressed as a closed form expression. For example, $1 + 2 + 3 + \cdots + 10$ is not acceptable for 55.
- Ordered pairs should always be represented as (a, b), including the parentheses and the comma. The same goes for n-tuples.
- Rational fractions must be simplified to lowest terms. $\frac{242}{363}$ is not acceptable for $\frac{2}{3}$
- Decimals are allowed only if they are exact.
  - 0.5 is acceptable for $\frac{1}{2}$
  - 0.333333 is not acceptable for $\frac{1}{3}$
  - 3.141592653589793 is not acceptable for π
- Radicals must be written in simplest form, i.e. you must take out perfect squares from under radicals. Denominators should be rationalized whenever possible, so be sure to multiply the top and the bottom by the complex conjugate or radical conjugate if the denominator has, for example, something of the form $a + bi$ or $a + b\sqrt{c}$. In general, carry out all reasonable calculations. You may request a regrade if you feel your answer should be accepted as correct, but all decisions of the MMT coordinators are final.
  - $\sqrt{24}$ is not acceptable for $2\sqrt{6}$
  - $\frac{1}{\sqrt{2}}$ can be accepted for $\frac{\sqrt{2}}{2}$
  - $\frac{1}{3+\sqrt{3}}$ is not acceptable for $\frac{3-\sqrt{3}}{6}$
  - $\frac{3-\sqrt{3}}{3+\sqrt{3}}$ is not acceptable for $2 - \sqrt{3}$
  - $\sqrt[4]{4}$ is not acceptable for $\sqrt{2}$