UTMC Acceptable Answers

UTMC Committee

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1 Introduction

In making this contest, the UTMC Committee wishes to emphasize *problem solving* and *ingenuity*, and thus wishes to ensure that every student that has derived a correct answer will recieve adequate credit for their work. In addition, the UTMC Committee aims to minimize the amount of computation that students must do. Of course, computations generally considered non-intensive should be done by the contestants, but the UTMC Committee wishes to maximize the amount of time spent on thinking of *how to solve the problem*, rather than arduous answer extraction. Thus, in general the UTMC Committee will be much more lenient with answers in different forms that are perhaps not completely simplified or done, as long as they are mathematically exact. This document will thus reflect this mantra of emphasis upon problem solving rather than computation.

2 Guidelines

A few general guidelines:

1. All answers must be **EXACT**, unless otherwise stated. With exact answers, no decimal approximations will be permitted. For example, the circumference of a circle with radius 1 must be expressed as 2π, instead of 6.28. Answers such as the latter will be graded as wrong unless the question specifically asks for a decimal approximation.
2. All fractions of rational numbers should be simplified. For example, $\frac{15}{20}$ should be simplified to $\frac{3}{4}$.
3. Radicals:
   (a) Fractions including radicals need not be rationalized. If the numerator and the denominator share a common factor that is an arithmetic combination of a radical and a rational number, then this factor should be divided out of both the numerator and the denominator. For example, $\frac{2+\sqrt{2}}{1+\sqrt{2}}$ should be simplified to $\sqrt{2}$.
   (b) However, a factor with a radical only in the denominator does not be rationalized for the answer to be considered correct. For example, $\frac{1}{1+\sqrt{2}}$ is a perfectly acceptable answer.
   (c) In addition, lone radicals need not be rationalized - $\frac{2}{\sqrt{3}}$ is a perfectly acceptable answer
4. Square factors should be taken out of radicals. $\sqrt{25}$ should be simplified as 5, and $\sqrt{216}$ should be represented as $6\sqrt{6}$.

5. Multiplication of two factors, both larger than 100, does not need to be carried out. In fact, in general any multiplication $a \cdot b$ resulting in a product larger than 1000 can generally be left as $a \cdot b$ in the answer sheet, instead of their numerical product.

6. Likewise, the calculation of large powers will not be required. Any n^{th} power of any integer larger than 1000 in absolute value (excluding 2^{10}), or any square of an integer larger than 100, can be left uncalculated within the answer sheet.

7. The values of trigonometric functions such as sin and cos must be evaluated for integer multiples of $\frac{\pi}{3}$ and $\frac{\pi}{4}$.

3 Examples

The easiest way to display what is considered correct and incorrect would be to demonstrate via a plethora of examples, so here is a chart listing which answers are considered acceptable and which answers are not.

Acceptable	Not Acceptable
5^{50}	25^{25}
2	$\frac{2+2\sqrt{2}}{1+\sqrt{2}}$
$9\sqrt{3}$	$\sqrt{3^5}$
$\sqrt{5}$	$\sqrt[4]{25}$
243, 25	3^5, 5^2
1/2	$cos(\frac{\pi}{2})$
$\frac{5\pi}{2}$	7.854
9409	97^2
$\frac{168}{241}$	$\frac{504}{723}$
621	$23 * 27$

4 Protests

Note that all these guidelines are rather subjective, and that any contestant wishing to argue for their answer should be able to do so due to such a flexible grading scheme. As a result, we will permit protests on the contestants if they wish to clarify their answers. We will release the deadline for contestants to clarify answers on the test date. However, if a contestant does not clarify their answer and they get a question wrong, this decision is final. Contestants will not be able to argue for their answers after the deadline, which includes after the contest has been completed.