

行程问题

甘源达

2016-04-06

题目：从甲地到乙地的公路 只有上坡路和下坡路,没有平路.一辆汽车上坡时每小时行驶20千米,下坡时每小时行驶35千米.车从甲地开往乙地需9时,从乙地到甲地需7.5时。问：甲乙两地间的距离公路有多少千米?从甲地到乙地须行驶多少千米上坡路？

1 理解题意

这道题看起来很简单，但理解起来却不是那么容易。首先，我们可以先把原题的数字改小一些，以便于我们探索这个问题的解法。现在我们先研究原问题的简化版：将10 本书分给6 名学生，至少有几名学生分到的书的数量相同。

怎么用数学语言来描述这个问题？ 如果我们有如下结论：将10 本书分给6 名学生，至少有2名学生分到的书的数量相同，怎么来理解这个结论？

$\frac{1}{2}$	$\frac{1}{2}$
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Geometry	Algebra
Points	Addition
Spheres	Multiplication

$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$						

The ends of words and sentences are marked by spaces. It doesn't matter how many spaces you type; one is as good as 100. The end of a line counts as a space.

One or more blank lines denote the end of a paragraph.

Since any number of consecutive spaces are treated like a single one, the formatting of the input file makes no difference to \LaTeX , but it makes a difference to you. When you use \LaTeX ,

Name	Exam	Grade
Dan	97%	A

Table 1: Math 101 Final Grades

making your input file as easy to read as possible will be a great help as you write your document and when you change it. This sample file shows how you can add comments to your own input file.

Because printing is different from typewriting, there are a number of things that you have to do differently when preparing an input file than if you were just typing the document directly. Quotation marks like “this” have to be handled specially, as do quotes within quotes: “‘this’ is what I just wrote, not ‘that’”.

Dashes come in three sizes: an intra-word dash, a medium dash for number ranges like 1–2, and a punctuation dash—like this.

A sentence-ending space should be larger than the space between words within a sentence. You sometimes have to type special commands in conjunction with punctuation characters to get this right, as in the following sentence. Gnats, gnus, etc. all begin with G. You should check the spaces after periods when reading your output to make sure you haven’t forgotten any special cases. Generating an ellipsis ... with the right spacing around the periods requires a special command.

L^AT_EX interprets some common characters as commands, so you must type special commands to generate them. These characters include the following: \$ & % # { and }.

In printing, text is usually emphasized with an *italic* type style.

A long segment of text can also be emphasized in this way. Text within such a segment can be given additional emphasis.

It is sometimes necessary to prevent L^AT_EX from breaking a line where it might otherwise do so. This may be at a space, as between the “Mr.” and “Jones” in “Mr. Jones”, or within a word—especially when the word is a symbol like *itemnum* that makes little sense when hyphenated across lines.

Footnotes¹ pose no problem.

L^AT_EX is good at typesetting mathematical formulas like $x-3y+z=7$ or $a_1 > x^{2n}+y^{2n} > x'$ or $(A,B) = \sum_i a_i b_i$. The spaces you type in a formula are ignored. Remember that a letter like x is a formula when it denotes a mathematical symbol, and it should be typed as one.

2 Displayed Text

Text is displayed by indenting it from the left margin. Quotations are commonly displayed. There are short quotations

This is a short quotation. It consists of a single paragraph of text. See how it is formatted.

¹This is an example of a footnote.

and longer ones.

This is a longer quotation. It consists of two paragraphs of text, neither of which are particularly interesting.

This is the second paragraph of the quotation. It is just as dull as the first paragraph.

Another frequently-displayed structure is a list. The following is an example of an *itemized* list.

- This is the first item of an itemized list. Each item in the list is marked with a “tick”. You don’t have to worry about what kind of tick mark is used.
- This is the second item of the list. It contains another list nested inside it. The inner list is an *enumerated* list.

1. This is the first item of an enumerated list that is nested within the itemized list.
2. This is the second item of the inner list. \LaTeX allows you to nest lists deeper than you really should.

This is the rest of the second item of the outer list. It is no more interesting than any other part of the item.

- This is the third item of the list.

You can even display poetry.

There is an environment for verse
Whose features some poets will curse.

For instead of making
Them do *all* line breaking,
It allows them to put too many words on a line when they’d rather be forced to be
terse.

Mathematical formulas may also be displayed. A displayed formula is one-line long; multiline formulas require special formatting instructions.

$$(\Gamma, \psi') = x'' + y^2 + z_i^n$$

Don’t start a paragraph with a displayed equation, nor make one a paragraph by itself.