

Math Font Quiz by Michael Spivak, for the PracT<sub>E</sub>X Journal, February 2006

1. Why did traditional typesetters often use an unslanted integral sign like  $\int$  or  $\int$  instead of a slanted one like  $\int$ ?

2. How tall must  $\int$  be so that `\left(...\right)` gives  $\left(\int\right)$ , with extensible parentheses, instead of  $\left(\int\right)$ , with

individually designed parentheses, and how tall must it be so that `\sqrt{...}` gives  $\sqrt{\int}$  with an extensible square root sign, instead of  $\sqrt{\int}$ , with an individually designed root sign?

3. Since the extension font can have up to 256 characters, of which only 128 are used up in T<sub>E</sub>X's usual extension font, it looks as if one could add up to 64 additional pairs of individually designed parentheses each 6 points taller than the previous. Why isn't this feasible?

4. Why does the spacing in  $\partial^2 f$ , with the *MathTime Professional* fonts, look so bad (with the Computer Modern fonts we get  $\partial^2 f$ , where the spacing doesn't look quite as bad, though it has the same problem). How can one fix this? Is it possible to have T<sub>E</sub>X fix this automatically? How about an extension of T<sub>E</sub>X?

5. Why do the *MathTime Professional* fonts, with formulas like  $M^i$ , have so many more kerns [some T<sub>E</sub>X's even have to be reconfigured to allow this many kerns!] than the Computer Modern fonts, with formulas like  $M^i$ ?

6. If you were using  $\mathcal{A}\mathcal{M}\mathcal{S}$ -T<sub>E</sub>X with the computer modern fonts, where the wide tilde in  $A_1 + \dots + A_n$  wouldn't be long enough, what would be the best way to indicate  $\overbrace{A_1 + \dots + A_n}$ ?

7. Suppose that instead of T<sub>E</sub>X's  $\sqrt{x^2 + y^2}$  you prefer  $\sqrt{x^2 + y^2}$ . How would you get it?

8. When Theorems are typeset in italics, you can get things like

*If  $0 < k < p$ , then ...*

with the *f* too close to the 0. How can you correct this? How can you have T<sub>E</sub>X automatically correct this?

9. The macros for chapter headings might use `\uppercase` so that they are automatically printed in uppercase letters (thereby leaving the headings as typed for the table of contents, etc., for example).

- (a) What problem does this cause with the chapter heading 'Differential Forms. First Exposition'?
- (b) What problems does this cause with the chapter heading 'Second-order subscripts; the proper size'?
- (c) How could you make a virtual font that had hypens and semi-colons appropriate for uppercase letters? How could the macros for chapter headings be changed so that problems (a) and (b) would be taken care of automatically?
- (d) Similarly, how would you handle specially designed accents for uppercase letters?

10. Typing `$M,$` gives  $M,$  with the comma snuggling close to the  $M$  but typing `$M$,` gives  $M,$  with the comma rather distant (with the Computer Modern fonts the effect is less pronounced; you get  $M,$  versus  $M,$ ). This means that when you follow the rules and type something like "If  $\$N>M\$$ , then ..." you get too much space between the  $M$  and the comma. How can you get around this? How can you use virtual fonts to have T<sub>E</sub>X automatically get around this?