You can shorten some work by defining macros:

1.1.1 iv) $\infty$ is a symbol that denotes something that is larger than any real number we can think of. As such, it is not a number.

A thought X’s favorite variable names are $x_1, \ldots, x_n$ and $y_1, \ldots, y_n$ and maybe $z$. Be careful how you use them: Let $A = \{x_1, \ldots, x_n\}$ and $B = \{y_1, \ldots, y_n\}$.

Review: Intermediate Value Theorem comes up all the time. (Note the backslash!!)

III This solution showcases how mathematics is done in \TeX.  

i) $\int_0^1 x^2 \, dx = \frac{1}{3}$. 

ii) $\int_0^1 x^2 \, dx = \frac{1}{3}$. 

iii) $\lim_{x \to \pi} \sin x = 0$. 

iv) $1 \leq 2$ and $2 \geq 1$. Also, $1 < 2$ and $2 > 1$. 

v) $2^{3x-1} \Rightarrow Q$, $f : A \to B$ is defined by $f(x) \mapsto x^{2x-4/x}$. 

When you want a big display:

$$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6},$$

and for an even bigger display:

$$\sum_{i=1}^{n} i = 1 + 2 + 3 + \cdots + n$$

$$= (1 + 2 + 3 + \cdots + (n-1)) + n$$

$$= \frac{(n-1)(n-1+1)}{2} + n \text{ (by induction hypothesis)}$$

$$= \frac{(n-1)n}{2} + \frac{2n}{2}$$

$$= \frac{n}{2} ((n-1) + 2)$$

$$= \frac{n}{2} (n + 1)$$

$$= \frac{n(n+1)(2n+1)}{6},$$

which proves the equality by induction.
If you want automatic numbering, do the following:

*Problem 1.* Answer is 1.4.

*Problem 2.* The answer is “yes”.

*Problem 3.* Greek letters: \(\alpha, \beta, \gamma, \delta, \ldots\), but not all capital versions exist (if they are the same as latin letters?): \(\Gamma, \Delta, \ldots\).

*Problem 4.* \(A \cap B, A \cup B\).

Note a new footline!