

1. Please remember that homework solutions should be:

- Clear
- Concise
- Precise
- Legible (if handwritten).

2. An example<sup>1</sup>:

(Yes) “According to the ‘fundamental theorem of arithmetic’ (proved in ex. 1.2.4-21), each positive integer  $u$  can be expressed in the form

$$u = 2^{u_2} 3^{u_3} 5^{u_5} 7^{u_7} 11^{u_{11}} \dots = \prod_{p \text{ prime}} p^{u_p}$$

where the exponents  $u_2, u_3, \dots$  are uniquely determined nonnegative integers, and where all but a finite number of the exponents are zero.”

(No) “If  $\mathbf{L}^+(P, N_0)$  is the set of functions  $f : P \rightarrow N_0$  with the property that

$$\exists_{n_0 \in N_0} \forall_{p \in P} p \geq n_0 \Rightarrow f(p) = 0$$

then there exists a bijection  $N_1 \rightarrow \mathbf{L}^+(P, N_0)$  such that if  $n \rightarrow f$  then

$$n = \prod_{p \in P} p^{f(p)}.$$

Here  $P$  is the prime numbers and  $N_1 = N_0 \sim \{0\}$ .”

3. Show that  $\mathbf{P} = \mathbf{NP}$ .

- (a) If  $\mathbf{N} = 1$  then  $\mathbf{P} = \mathbf{P}$ .
- (b) If  $\mathbf{P} = 0$  then  $0 = 0$ .
- (c) Collect \$1 million.

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<sup>1</sup>Taken from *Mathematical Writing* by Knuth, Larrabee, and Roberts.

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