

1. Please remember that homework solutions should be:

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

2. An example¹:

(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.

¹Taken from *Mathematical Writing* by Knuth, Larrabee, and Roberts.

4. This page intentionally left blank.