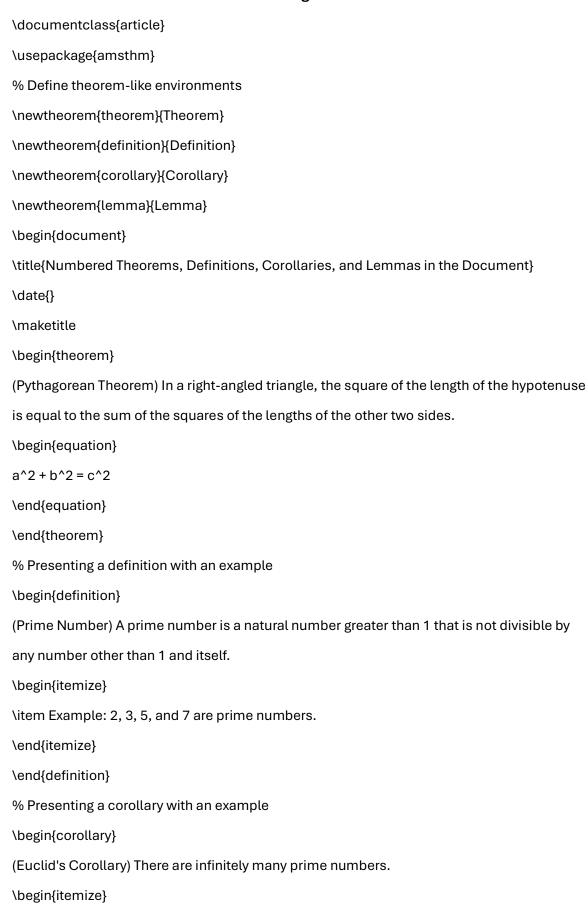
Program 8



\item Proof: Assume there are finitely many primes. Let them be \$p_1, p_2, \ldots, p_n\$.

Consider the number $N = p_1 \cdot p_2 \cdot p_n + 1$.

This number is not divisible by any of the primes \$p_1\$ through \$p_n\$.

Therefore, there must be a prime factor not in the list, contradicting the assumption that there are only finitely many primes.

\end{itemize}

\end{corollary}

% Presenting a lemma with an example

\begin{lemma}

(Basic Arithmetic Identity) For any real numbers \$a\$ and \$b\$, we have:

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\begin{equation}

$$(a + b)^2 = a^2 + 2ab + b^2.$$

\end{equation}

\end{lemma}

\end{document}