

Assignment 2

- 1) Prove that $\gcd(n, n+1) = 1$ for every integer n .
- 2) Find the smallest positive integer in the set $\{6u + 15v \mid u, v \in \mathbf{Z}\}$.
- 3) Prove that if a is odd then $4 \mid (a^2 - 1)$.
- 4) Prove that if a is odd and b is even then $\gcd(a, b) = \gcd(a+b, a-b)$.
- 5) Prove that if $3 \mid (a^2 + b^2)$ then $3 \mid a$ and $3 \mid b$.
- 6) Prove that $\sqrt{30}$ is irrational (i.e., $\sqrt{30}$ cannot be presented in the form $\frac{m}{n}$ where $m, n \in \mathbf{Z}$).
- 7) Show that $2^{11} - 1$ is not a prime number.
- 8) Find all positive integers n such that n , $n+2$, and $n+4$ are all prime.