6. To prove that the only prime triple is 3, 5, 7.

Let's assume p is a prime number.

For a prime triple to exist, p, $p+2$ & $p+4$ must all be primes & $p \in \mathbb{N}$.

But, we have just seen (Problem 5) that one of p, $p+2$, $p+4$ are always divisible by 3. Hence p, $p+2$, $p+4$ cannot all be primes unless p or $p+2$ are themselves equal to 3 ($\because p+4 > 3 \ \forall p \in \mathbb{N}$)

But for $p+2$ to be equal to 3, p should be 1, which is not a prime by definition.

Therefore p has to be equal to 3.

$\therefore$ The only prime triple is $3 (= p)$, $5 (= p+2)$, $7 (= p+4)$.