(6) prove that the only prime Triple (3 primes, 2 apart) is 3, 5, 7

Proof by contradiction:

Assume n is prime such that

n, $n+2$, $n+4$ are all prime.

but by problem (5), we know that at least one of n, $n+2$, $n+4$ is divisable by 3

This is true for $n=3$, but for

Any other set of prime numbers,

n, $n+2$, $n+4$ cannot have one of these divisable by 3 (since, if it were then it would not be prime)

So we have a contradiction. Therefore there cannot be a set of prime n, $n+2$, $n+4$ unless $n=3$