

Max Gebski - Answers to Test Flight Problem Set

Question 6

A classic unsolved problem in number theory asks if there are infinitely many pairs of ‘twin primes’, pairs of primes separated by 2, such as 3 and 5, 11 and 13, or 71 and 73.

Prove that the only prime triple (i.e. three primes, each 2 from the next) is 3, 5, 7.

A prime triplet is a sequence of three prime numbers separated by 2. This would mean that we can write it in the form $n, n + 2, n + 4$.

When $n = 3$ the prime triplet would be 3, 5, 7 so in order to find another one $n > 3$.

However, in question 5 we proved that for any integer n , at least one of the integers $n, n + 2, n + 4$ is divisible by 3. This means that at least one of the three numbers is not a prime.

Hence 3, 5, 7 is the only prime triplet. Proof complete.