

Test Flight Problem Set 6

Proposition: 3, 5, 7 is the only set of three primes of the form $n, n + 2, n + 4$

Proof:

By the solution to problem 5, for any integer n , at least one of $n, n + 2, n + 4$ is divisible by 3

Given the only prime number divisible by 3 is 3

Therefore, if $n, n + 2, n + 4$ is a prime triple, one of $n, n + 2, n + 4$ must be 3

The possible cases are:

The first in the set is 3, giving the triple 3, 5, 7

The second in the set is 3, giving the triple 1, 3, 5

The third in the set is 3, giving the triple -1, 1, 3

Since 1 is not a prime number, only the first case 3, 5, 7 can be a prime triple

Finally, 3, 5, and 7 are clearly all prime, completing the proof