

1 Prove algebraically that the sum of any two consecutive integers is always an odd number.

(2 marks)

2 Prove algebraically that the sum of any three consecutive even integers is always a multiple of 6.

(2 marks)

3 Prove that $(3n + 1)^2 - (3n - 1)^2$ is always a multiple of 12, for all positive integer values of n .

(2 marks)

4 n is an integer.
Prove algebraically that the sum of $n(n + 1)$ and $n + 1$ is always a square number.

(2 marks)

5 Prove that $(2n + 3)^2 - (2n - 3)^2$ is always a multiple of 12, for all positive integer values of n .

(2 marks)

6 n is an integer.
Prove algebraically that the sum of $(n + 2)(n + 1)$ and $n + 2$ is always a square number.

(2 marks)

7 Prove that the sum of 3 consecutive odd numbers is always a multiple of 3.

(2 marks)

8 Prove that the sum of 3 consecutive even numbers is always a multiple of 6.

(2 marks)

9 Prove algebraically that the sum of the squares of any 2 even positive integers is always a multiple of 4.

(2 marks)

10 Prove algebraically that the sum of the squares of any 2 odd positive integers is always even.

(2 marks)

11 Prove that the sum of the squares of any two consecutive integers is always an odd number.

(3 marks)

12 Prove that the sum of the squares of two consecutive odd numbers is always 2 more than a multiple of 8

(2 marks)

13 Prove that the difference between the squares of any 2 consecutive integers is equal to the sum of these integers.

(3 marks)

14 Prove algebraically that the sums of the squares of any 2 consecutive even numbers is always 4 more than a multiple of 8.

(3 marks)