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

(2 marks)

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

(2 marks)

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

(2 marks)

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

(2 marks)

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

(2 marks)

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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)

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

(2 marks)

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

(2 marks)

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

(2 marks)

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

(2 marks)

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

(3 marks)

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

(2 marks)

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

(3 marks)

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

(3 marks)
