Algebraic Proof with Multiples

(a) Show that $4(n+3)-n$ is a multiple of 3 for all integer values of n

(b) Show that $(n+2)^2+3n^2$ is a multiple of 4 for all integer values of n

(c) Show that $(3n-1)^2-(2n+1)^2$ is a multiple of 5 for all integer values of n

(d) Show that $(2n+1)(4n-3)-(n+2)^2-n$ is a multiple of 7 for all integer values of n

(a) Show that the sum of three consecutive integers is always a multiple of 3

(b) Show that the sum of three consecutive even numbers is always a multiple of 6

(c) Show that the product of two consecutive even numbers is always a multiple of 4

(a) Prove algebraically that the sum of three consecutive square numbers is never a multiple of 3

(b) Prove algebraically that the sum of the squares of any two odd numbers is never a multiple of 4

(c) Prove algebraically that the product of two consecutive odd numbers is never a multiple of 4

(a) Prove algebraically that the product of three consecutive even numbers is always a multiple of 8

(b) Prove algebraically that the sum of the cubes of two consecutive even numbers is always a multiple of 8

(c) Prove algebraically that the product of the squares of two odd numbers is always one more than a multiple of 4

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