**Algebraic Proof**

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| **1)** If  $n$ is a positive integer, which of the following numbers is always odd?

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|   | **A.** |  $7n+6$ | **B.** |  $n+3$ | **C.** |  $12n+7$ | **D.** |  $5n^{2}-8$ |

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| **2)** If  $n$ is a positive integer, which of the following numbers is always even?

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|   | **A.** |  $3n^{2}-2$ | **B.** |  $n+9$ | **C.** |  $11n-4$ | **D.** |  $8n+8$ |

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| **3)** If  $n$ is a positive integer, which of the following shows two consecutive square numbers?

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|   | **A.** |  $(n+5)^{2}$ and  $(n+6)^{2}$ | **B.** |  $n^{2}$ and  $n^{2}+1$ |
|  |
|   | **C.** |  $n^{2}$ and  $(n+3)^{2}$ | **D.** |  $n^{2}$ and  $n^{2}+3$ |

      | [1]   |
| **4)** If  $n$ is a positive integer, then  $14n+7$ is a multiple of:-

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|   | **A.** | 7 | **B.** | 5 | **C.** | 6 | **D.** | 4 |

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| **5)** Prove, using algebra, that the sum of two consecutive whole numbers is always an odd number.

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| **6)** Prove that  $(2n+3)^{2}-(2n-3)^{2}$ is a multiple of 4, for all positive integer values of n.

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| **7)** Prove that  $(5n+2)^{2}-(5n-2)^{2}$ is a multiple of 8, for all positive integer values of n.

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| **8)** Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

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**Solutions for the assessment Algebraic Proof**

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| **1)**  $C$ | **2)**  $D$ |
| **3)**  $A$ | **4)**  $A$ |
| **5)**  $n-1+n-2=2n-3$So, as  $2n$ is divisible by  $2$ and  $-3$ is an odd number.Therefore, the sum of two consecutive whole numbers is always an odd number. | **6)**  $(4n^{2}+12n+9)-(4n^{2}-12n+9)$ $=24n$ $=4(6n)$So, as  $24$ is divisible by  $4$ then  $(2n+3)^{2}-(2n-3)^{2}$ is a multiple of 4, for all positive integer values of n. |
| **7)**  $(25n^{2}+20n+4)-(25n^{2}-20n+4)$ $=40n$ $=8(5n)$So, as  $40$ is divisible by  $8$ then  $(5n+2)^{2}-(5n-2)^{2}$ is a multiple of 8, for all positive integer values of n. | **8)** Sum of two consecutive integers:- $n-4+n-3$ $=2n-7$Difference between the squares of two consecutive integers:- $(n-4)^{2}-(n-3)^{2}$ $=(n^{2}-8n+16)-(n^{2}-6n+9)$ $=2n-7$So they are equal |