**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.** |  $11n-3$ | **B.** |  $n+4$ | **C.** |  $8n+5$ | **D.** |  $2n^{2}-5$ |

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

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|   | **A.** |  $2n^{2}-3$ | **B.** |  $n-6$ | **C.** |  $9n+3$ | **D.** |  $4n-2$ |

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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.** |  $n^{2}$ and  $n^{2}+7$ | **B.** |  $n^{2}$ and  $(n+1)^{2}$ |
|  |
|   | **C.** |  $n^{2}$ and  $(n+8)^{2}$ | **D.** |  $n^{2}$ and  $n^{2}+8$ |

      | [1]   |
| **4)** If  $n$ is a positive integer, then  $6n+24$ is a multiple of:-

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|   | **A.** | 5 | **B.** | 4 | **C.** | 6 | **D.** | 3 |

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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  $(2n+1)^{2}-(2n-1)^{2}$ is a multiple of 4, for all positive integer values of n.

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| **7)** Prove that  $(7n+2)^{2}-(7n-2)^{2}$ 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)**  $B$ | **4)**  $C$ |
| **5)**  $n+n-1=2n-1$So, as  $2n$ is divisible by  $2$ and  $-1$ is an odd number.Therefore, the sum of two consecutive whole numbers is always an odd number. | **6)**  $(4n^{2}+4n+1)-(4n^{2}-4n+1)$ $=8n$ $=4(2n)$So, as  $8$ is divisible by  $4$ then  $(2n+1)^{2}-(2n-1)^{2}$ is a multiple of 4, for all positive integer values of n. |
| **7)**  $(49n^{2}+28n+4)-(49n^{2}-28n+4)$ $=56n$ $=8(7n)$So, as  $56$ is divisible by  $8$ then  $(7n+2)^{2}-(7n-2)^{2}$ is a multiple of 8, for all positive integer values of n. | **8)** Sum of two consecutive integers:- $n+6+n+7$ $=2n+13$Difference between the squares of two consecutive integers:- $(n+6)^{2}-(n+7)^{2}$ $=(n^{2}+12n+36)-(n^{2}+14n+49)$ $=2n+13$So they are equal |