**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.** |  $13n+6$ | **B.** |  $n-2$ | **C.** |  $2n+5$ | **D.** |  $5n^{2}+2$ |

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

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|   | **A.** |  $11n-3$ | **B.** |  $n+4$ | **C.** |  $10n+4$ | **D.** |  $4n^{2}+1$ |

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

      | [1]   |
| **4)** If  $n$ is a positive integer, then  $4n+8$ is a multiple of:-

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|   | **A.** | 6 | **B.** | 3 | **C.** | 7 | **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  $(5n+4)^{2}-(5n-4)^{2}$ 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)**  $C$ |
| **3)**  $B$ | **4)**  $D$ |
| **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)**  $(25n^{2}+40n+16)-(25n^{2}-40n+16)$ $=80n$ $=4(20n)$So, as  $80$ is divisible by  $4$ then  $(5n+4)^{2}-(5n-4)^{2}$ 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:- $n+n-1$ $=2n-1$Difference between the squares of two consecutive integers:- $(n)^{2}-(n-1)^{2}$ $=(n^{2})-(n^{2}-2n+1)$ $=2n-1$So they are equal |