Algebraic Proofs

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1) Prove that $\frac{1}{2}(n+1)(n+2) - \frac{1}{2}n(n+1) = n+1$

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(2 Marks)

2) Prove that $(2n+1)^2 - (2n-1)^2$ is a multiple of 8 for all positive integer values of n.

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(2 Marks)

3) Prove that $(2n+1)^2 - (2n-1)^2 - 10$ is a not multiple of 8 for all positive integer values of n.

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(2 Marks)

1) Algebraic Proofs: Medium

4) Prove algebraically that the sum of the squares of any two consecutive even numbers is always a multiple of 4.

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(2 Marks)

5) Prove algebraically that the difference between the squares of any two consecutive even numbers is always a multiple of 4.

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(2 Marks)

6) Prove algebraically that the difference between the squares of any two consecutive numbers is always an odd number.

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(2 Marks)

1) Algebraic Proofs: Harder

7) Prove algebraically that the sum of the squares of any two consecutive odd numbers cannot be a multiple of 4.

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(2 Marks)

8) Prove algebraically that the sum of the squares of any three consecutive odd numbers always leaves a remainder of 11 when divided by 12.

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(2 Marks)