



SCAN ME

Algebraic Proof



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← REVISE THIS TOPIC

CHECK YOUR ANSWERS →

1 Prove that $(n + 5)^2 - (3n + 8) = (n + 3)(n + 4) + 5$ [3 marks]

2 Prove that $(2n - 1)^2 - (n - 3)^2 = (3n - 1)(n + 1) - 7$ [3 marks]





3 Prove that $(3n - 5)^2 - 2(4n - 5)(n - 3) = (n + 5)(n - 1)$ [3 marks]

4 Prove that $(n - 3)^2 - (15 + n)(15 - n) = 2(n - 12)(n + 9)$ [3 marks]





7 n is a positive integer.
Prove algebraically that $(2n + 5)^2 - (2n + 1)^2$ is always a multiple of 8 [3 marks]

8 n is a positive integer such that $n > 2$
Prove algebraically that $(2n + 3)^2 + (3 - n)^2 - (n + 5)^2$ is always one more than a multiple of 4. [4 marks]





9 Prove algebraically that the sum of five consecutive positive integers is always a multiple of 5. [2 marks]

10 Arjan says:
“The sum of four consecutive positive integers is always a multiple of 4”.
Use an algebraic method to prove that Arjun is incorrect. [2 marks]

Turn over ►





11 Prove algebraically that the sum of six consecutive positive integers is always a multiple of 3. [2 marks]

12 n is a positive integer.
Prove that $(4n - 3)^2 - 3(5n - 3)(n - 1)$ is always a square number. [3 marks]





13

n is a positive integer.

Prove that $(3n + 1)(9n^2 - 3n + 1)$ is always 1 more than a cube number. **[4 marks]**

14

n is a positive integer.

Prove that $(n + 2)^3 - n^3$ is always even.

[4 marks]

Turn over ►





15 n is an integer.
Prove that $n^2 - 6n + 10$ is always positive. [3 marks]

16 n is an integer.
Prove that $n^2 + 3n + 3$ is always positive. [3 marks]

17 n is an integer.
Prove that $2n - n^2 - 2$ is always negative. [3 marks]





18

n and m are consecutive integers and $m > n$.

Prove algebraically that $m^2 - n^2$ is always an odd number.

[3 marks]

19

n and m are consecutive integers and $m > n$.

Prove algebraically that $mn + m$ is always a square number.

[3 marks]



Turn over ►





20

Prove algebraically that the sum of three consecutive even numbers is always a multiple of 6.

[2 marks]

21

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

[3 marks]





22

Prove algebraically that the sum of the squares of three consecutive integers is one less than a multiple of 3.

[4 marks]

23

Prove algebraically that the difference between the squares of consecutive integers is equal to the sum of the two integers.

[3 marks]

Turn over ►





24

Prove algebraically that the product of two consecutive odd numbers is one less than a multiple of 4.

[3 marks]

25

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

[3 marks]





26

a and b are positive integers.
 a is two more than a multiple of 5.
 b is two less than a multiple of 5.

Prove that ab is one more than a multiple of 5.

[4 marks]

27

Prove that the sum of the squares of three consecutive integers is equal to five more than three times the product of the largest and smallest of the three integers.

[3 marks]

