Name:

Level 2 Further Maths

Algebraic Proof

Corbettmaths

Ensure you have: Pencil or pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Revision for this topic

www.corbettmaths.com/more/further-maths/

1. Prove that the sum of three consecutive integers is divisible by 3.

(3)

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2. Prove $(n + 6)^2 - (n + 2)^2$ is always a multiple of 8

(4)

3. Prove $(n + 10)^2 - (n + 5)^2$ is always a multiple of 5

(4)

4. Prove the sum of two consecutive odd numbers is even.

(3)

5. Prove $(2n + 1)(3n – 2) – (6n – 1)(n – 2)$ is always even

(3)

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

(3)

7. Prove the sum of four consecutive odd numbers is always a multiple of 8

(4)

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8. Prove $(2n + 9)^2 - (2n + 5)^2$ is always a multiple of 4

(4)

9. Prove $(n + 1)^2 + (n + 3)^2 - (n + 5)^2 = (n + 3)(n - 5)$

(4)

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10. Prove the product of two even numbers is always even

(3)

11. Prove the product of three consecutive odd numbers is odd

(3)

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12. Prove algebraically that the sum of the squares of two odd integers is always even.

(4)

13. Prove that when two consecutive integers are squared, that the difference is equal to the sum of the two consecutive integers.

(4)

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14. Prove algebraically that

$$(4n + 1)^2 - (2n - 1) \text{ is an even number}$$

for all positive integer values of n.

(4)

15. Prove that $3n(3n + 4) + (n - 6)^2$ is positive for all values of n

(4)

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16. The first five terms of a linear sequence are 5, 11, 17, 23, 29 …

(a) Find the nth term of the sequence

……..

(2)

A new sequence is generated by squaring each term of the linear sequence and then adding 5.

(b) Prove that all terms in the new sequence are divisible by 6.

(4)

17. Prove that the product of two consecutive even numbers is a multiple of 4.

(3)

18. Prove that when any odd integer is squared, the result is always one more than a multiple of 8.

(4)

19. Prove that the product of two odd numbers is always odd.

(3)

20. Given $2^{89} - 1$ is prime.

Show that $2^{89} + 1$ is a multiple of 3

(3)