Name:

Exam Style Questions

Algebraic Proof



Equipment needed: Pen

Guidance

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

Video Tutorial

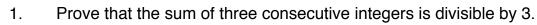
www.corbettmaths.com/contents

Video 365



Answers and Video Solutions







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





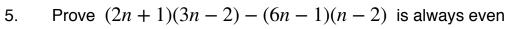
Prove $(n+10)^2 - (n+5)^2$ is always a multiple of 5



(4)

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

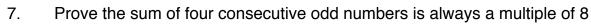






6. Prove that the sum of three consecutive even numbers is always a multiple of 6



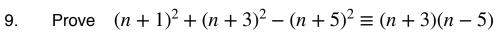




(4)

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



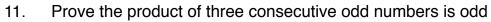




(4)

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







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



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

(4)

14. Given x is a positive integer.



Prove that $(2x + 3)^2 - 3x(x + 2)$ is a square number.



15. Prove that the sum of the squares of 3 consecutive positive integers is always 1 less than a multiple of 3.

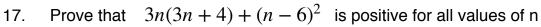
(4)

Prove algebraically that 16.



$$(4n+1)^2 - (2n-1)$$
 is an even number

for all positive integer values of n.





(4)

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

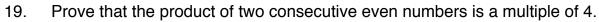


(a) Find the nth term of the sequence

(2)

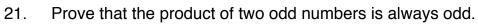
A new sequence is generated by squaring each term of the linear sequence and then adding 5.

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





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





22. Prove algebraically that every term in the sequence $n^2 - 12n + 38$ is positive.



23. Prove that the sum of the cubes of two consecutive odd integers is always a multiple of 4.