

GCSE MATHS • GRADE 9

MATHS



EXAM QUESTION PACK

PROOF

SCORE

/92

PERCENTAGE

%

STEMUP

- 1 n is an integer.
Show that the product of two consecutive integers is even.

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 / 1

- 2 n is an integer.
Prove that the sum of three consecutive odd numbers is odd.

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 / 1

- 3 Prove that the difference between the squares of any two consecutive integers is equal to the sum of the two integers.

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 / 1

- 4 Show that the product of two consecutive integers is even.

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 / 1

- 5 n is an integer.
Prove that the sum of six consecutive integers is 3 more than a multiple of 6.

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 / 1

- 6 Prove that the difference between the squares of any two consecutive integers is equal to the sum of the two integers.

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 / 1

7 Prove that $n^2 + n$ is always even, where n is an integer.

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 / 1

8 Prove algebraically that the sum of the squares of any two even positive integers is a multiple of 4.

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 / 1

9 Prove that the sum of any 2 consecutive integers is equal to the difference between their squares.

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 / 1

10 n is an integer.

Prove that the sum of six consecutive integers is 3 more than a multiple of 6.

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 / 1

11 n is an integer.

Prove that $(n + 1)^2 - (n - 1)^2$ is a multiple of 4.

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 / 1

12 Prove algebraically that the difference between the squares of any 2 consecutive integers is equal to the sum of these integers.

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 / 1

13 n is an integer.

Prove algebraically that the sum of seven consecutive integers is a multiple of 7.

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 / 1

14 n is an integer.

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

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 / 1

15 Show that the sum of the squares of any two multiples of 7 is a multiple of 49.

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 / 1

16 Prove algebraically that $(a + b)^2 - (a - b)^2 = 4ab$

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 / 1

17 n is an integer.
Show that the sum of three consecutive odd numbers is a multiple of 3.

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 / 1

18 Prove algebraically that the sum of the squares of any two multiples of 5 is a multiple of 25.

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 / 1

- 19** Prove that the sum of the squares of any two consecutive integers is always an odd number.

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 / 1

- 20** n is an integer.
Prove that the sum of three consecutive even numbers is a multiple of 6.

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 / 1

- 21** Prove algebraically that the sum of the squares of any two multiples of 3 is a multiple of 9.
You must show your working.

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 / 2

- 22 n is an integer.
Show that $(n + 3)(n + 7) + 4$ is a perfect square.
You must show your working.

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 / 2

- 23 n is an integer.
Prove algebraically that the sum of four consecutive even numbers is a multiple of 4.
You must show your working.

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 / 2

- 24 n is an integer.
Prove that the sum of $n(n + 1)$ and $n + 1$ is always a square number.

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 / 2

- 25 Show that the difference between the squares of two consecutive even numbers is a multiple of 4.

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 / 2

- 26 Show that the sum of the squares of any two odd positive integers is even.
You must show your working.

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 / 2

- 27 n is an integer.
Prove that the sum of $(n + 1)(n + 2)$ and $n + 2$ is always a square number.

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 / 2

- 28** Prove that the difference between the squares of two consecutive even numbers is a multiple of 4.
You must show your working.

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 / 2

- 29** Show that the sum of the squares of any two odd positive integers is even.

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 / 2

- 30** n is an integer.
Prove algebraically that the sum of $(n + 3)(n + 2)$ and $n + 3$ is always a square number.

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 / 2

- 31** Show that the sum of the squares of any two consecutive integers is 1 more than twice the product of the two integers.
You must show your working.

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 / 2

- 32** A two-digit number has tens digit a and units digit b .
The digits are reversed to make a new number.
Prove algebraically that the difference between the two numbers is a multiple of 9.

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 / 2

- 33** n is an integer.
Prove that the sum of $(n + 4)(n + 3)$ and $n + 4$ is always a square number.
You must show your working.

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 / 2

- 34** Prove that the difference between the squares of two consecutive odd numbers is a multiple of 8.

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 / 2

- 35** Prove that the difference between the squares of any two odd positive integers is a multiple of 4.

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 / 2

- 36** Prove algebraically that the sum of the squares of any two consecutive multiples of 3 is a multiple of 9.

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 / 2

37 Prove that $x^2 - 10x + 32$ is always greater than 0 for all values of x .

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 / 2

38 Prove that the sum of the squares of any two odd positive integers is 2 more than a multiple of 4.
You must show your working.

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 / 2

39 Show that the sum of the squares of any two consecutive multiples of 5 is a multiple of 25.

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 / 3

40 Prove algebraically that $x^2 - 4x + 12$ is always greater than 0 for all values of x .

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 / 3

41 n is an integer.
Prove that $(5n)^2 - (3n - 2)^2$ is a multiple of 4.

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 / 3

42 Show that the sum of the squares of any two consecutive even numbers is 4 more than a multiple of 8.

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 / 3

43 Prove that the product of two consecutive even numbers is a multiple of 8.

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 / 3

44 n is an integer.
Prove that $(5n + 3)^2 - (3n - 1)^2$ is a multiple of 4.

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 / 3

45 Prove algebraically that the sum of the squares of any two consecutive even numbers is 4 more than a multiple of 8.
You must show your working.

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 / 3

- 46 A three-digit number has digits a , b and c , where a is the hundreds digit.
Prove that the number is a multiple of 3 when $a + b + c$ is a multiple of 3.

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 / 3

- 47 n is an integer.
Prove that $(4n + 3)^2 - (n + 2)^2$ is a multiple of 5.

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 / 3

- 48 Prove that $(m^2 - n^2)^2 + (2mn)^2 = (m^2 + n^2)^2$

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 / 3

49 n is an integer.

Prove algebraically that $(n + 5)^2 - (3n - 1)^2$ is a multiple of 8.

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 / 3

50 n is an integer.

Prove algebraically that $(4n - 2)^2 - (2n - 4)^2$ is a multiple of 12.

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 / 3