Algebraic proof

1

Write each one using n.

An even number

$2n$

An odd number

Three consecutive integers

, ,

2

Write each one using n.

Two consecutive even numbers

,

Two consecutive odd numbers

,

An even number and the next odd number

,

3

Prove that the sum of three consecutive integers is a multiple of 3.

n + $n+1$ + $n+2$

$= 3n + 3$

=

So it is _____

4

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

$2n+1$ + $2n+3$

=

=

So it is _____

5

Prove that the sum of five consecutive integers is a multiple of 5.

=

=

So it is _____

6

Prove that $(n+6)^2 - n^2$ is a multiple of 12.

$n^2 + 12n + 36 - n^2$

$= 12n + 36$

=

So it is _____

7

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

$n^2 + 10n + 25 - (n^2 + 6n + 9)$

=

=

So it is _____

8

Kim tries to prove that $(n+3)^2 - n^2$ is a multiple of 3.
She writes $n^2 + 9 - n^2 = 9 = 3 \times 3$.
Explain her mistake. Then write a correct proof.

So it is _____

Algebraic proof *further practice*

9

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

So it is _____

10

Jo writes two consecutive odd numbers as $2n + 1$ and $2n + 2$.
Explain her mistake.

Answer _____

11

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

So it is _____

12

Prove that the square of an even number is a multiple of 4.

So it is _____

13

Kai picks three consecutive integers.
Prove that their sum is 3 times the middle one.

Answer _____

14

Prove that the sum of six consecutive integers is odd.

So it is _____

15

Pick three consecutive integers.
Square the middle one.
Multiply the other two. Prove that the difference is always 1.

Answer _____

16

Mia works out 2 + 4 = 6, 6 + 8 = 14 and 10 + 12 = 22. She says this proves that the sum of two consecutive even numbers is never a multiple of 4.
Explain why this is not a proof.
Then prove it.

Answer _____