Algebraic proof *lesson handout*

Copy and complete

Work out $2n$ and $2n + 1$.

n	1	2	3	4	5
$2n$					
$2n + 1$					

We do, You do

Write each one using n.

Two consecutive even numbers

$2n$, ____

Two consecutive odd numbers

____ , ____

An odd number and the next even number

____ , ____

We do

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

$2n$ + $2n + 2$

= ____

= ____

So it is ____

You do

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

____ + ____ + ____

= ____

= ____

So it is ____

You do

Prove that the sum of an odd number and the next even number is odd.

____ + ____

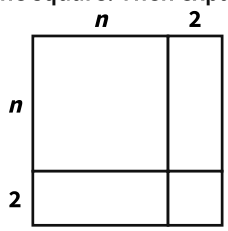
= ____

= ____

So it is ____

Show why

Label each part of the square. Then expand.



$(n + 2)^2$ = ____

We do

Prove that $(n + 1)^2 - n^2$ is odd.

$n^2 + 2n + 1 - n^2$

= ____

= ____

So it is ____

You do

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

____

= ____

= ____

So it is ____

You do

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

____

= ____

= ____

So it is ____

Always, sometimes or never?

Ring one for each.

1. The sum of two odd numbers is even.

Always · Sometimes · Never

2. $n + 2$ is even.

Always · Sometimes · Never

3. The sum of three consecutive integers is a multiple of 6.

Always · Sometimes · Never

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

Always · Sometimes · Never