

"Multiply two consecutive odd numbers, then subtract one."

Trials	Number between them squared
$1 \times 3 - 1 = 2$	4
$3 \times 5 - 1 = 14$	16
$5 \times 7 - 1 = 34$	36
$7 \times 9 - 1 = 62$	64
$9 \times 11 - 1 = 98$	100

It seems that, when we compare the trials with the square of the even number between them, the difference is two.

Proof

To describe an even number, we use  $2x$ , so to describe the two numbers either side, we can use  $2x-1$  and  $2x+1$ . To describe the number between squared, we can use  $(2x)^2$ , which simplifies to  $4x^2$ . We need to prove that:

$$(2x-1)(2x+1)-1 = 4x^2-2$$

If we simplify this, we get:

$$\begin{aligned} & (2x-1)(2x+1)-1 \\ &= 4x^2+2x-2x-1-1 \\ &= \underline{4x^2-2} \text{ as required} \end{aligned}$$

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