A-Level Starter Activity

Jethwa Maths

Topic: Proof by Counter Example Chapter Reference: Pure 1, Chapter 7	**6 minutes**

1. 'If m and n are irrational numbers, where $m \neq n$, then mn is also irrational.'
Disprove this statement by means of a counter example. **(2)**

2. 'For every real number x, $(x + 1)^2 = x^2 + 1$.'
Disprove this statement by means of a counter example.

3. 'If n is an integer and n^2 is divisible by 4, then n is divisible by 4'.
Disprove this statement by means of a counter example.

Solutions

1.

$3\sqrt{2} = \sqrt{(9)(2)} = \sqrt{18}$	**M1**
$\sqrt{2}\,\sqrt{18} = \sqrt{36} = 6$ So if *m* and *n* are irrational numbers then *mn* is not always irrational.	**M1**

2.

$(x + 1)^2 = x^2 + 1$ When $x = -2$	**M1**
$(-2 + 1)^2 = (-2)^2 + 1$ $1 \neq 5$ Therefore, proof by counter example.	**M1**

3.

Consider $n = 6$ (or suitable alternative)	**M1**
$n^2 = 36$ n^2 is divisible by 4, but n is not. Therefore, proof by counter example.	**M1**