

Name Prof. M

Mathematics 2602

Quiz 5

Prof. Margalit

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1. Use induction to prove that the following statement is true for  $n \geq 1$ :

$$1 + 3 + \dots + (2n - 1) = n^2.$$

Base case:  $n = 1$

$$1 = 1^2 \quad \checkmark$$

Assume  $1 + 3 + \dots + (2k-1) = k^2$

Want to show  $1 + 3 + \dots + (2k+1) = (k+1)^2$

Indeed:  $1 + 3 + \dots + (2k+1)$

$$= (1 + 3 + \dots + (2k-1)) + (2k+1)$$

$$= k^2 + (2k+1) \quad \text{by inductive hypothesis}$$

$$= (k+1)^2.$$