

# Homework 3: Induction in Algebra

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**Problem 1.**

Show that

$$\left(1 - \frac{1}{4}\right) \left(1 - \frac{1}{9}\right) \cdots \left(1 - \frac{1}{n^2}\right) = \frac{n+1}{2n}$$

**Problem 2.**

Show that

$$1 + x + x^2 + \dots + x^n = \frac{x^{n+1} - 1}{x - 1}$$

**using induction.**

**Problem 3.**

Kiselev 274, p. 102.