Lesson 3: Induction in Algebra

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Problem 1.
Show that

\[ 2 + 5 + 8 + \ldots + (3n - 1) = \frac{3n^2 + n}{2} \]

Problem 2.
Show that

\[ \frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \ldots + \frac{1}{(n-1) \cdot n} = \frac{n - 1}{n} \]

Problem 3.
Show that

\[ \frac{1}{n + 1} + \frac{1}{n + 2} + \ldots + \frac{1}{2n} > \frac{13}{24} \]

for all \( n \geq 2 \).

Problem 4.
Let \( ABCD \) be points lying on a circle, in this order. Show that the opposite angles of the quadrilateral \( ABCD \) add up to 180°.

Problem 5.
Kiselev 270, p. 101

Problem 6.
Kiselev 273, p. 102