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