A caring father wishes to pay for his child's education with 4 annual payments of 100,000. He plans to accumulate the amount needed by depositing 1,000 into an account at the beginning of the every month. The first tuition payment will be made 6 months after the last deposit. What is the minimum number of deposits necessary to accumulate enough to make the payments if the interest he earns on his investment is 6% nominal annual rate compounded monthly?

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 204</td>
<td>B. 205</td>
</tr>
<tr>
<td>C. 210</td>
<td>D. 1500</td>
</tr>
<tr>
<td>E. 1501</td>
<td></td>
</tr>
</tbody>
</table>

Solution.
The monthly effective interest rate is 0.5%. The effective annual interest rate applicable is

\[ j = \left(1 + \frac{0.06}{12}\right)^{12} - 1 \approx 6.1678\%. \]

The value of future tuition payments at the time of exactly one month after the last monthly savings payment is

\[ 1.005^{-5} \cdot 100000 \cdot \ddot{a}_{\bar{\nu}} \approx 357,447.59. \]

If \( n \) is the number of payments made into the savings account, using the effectively monthly interest rate of 0.5%, the equation of value is

\[ 1000 \cdot \ddot{s}_{\bar{\nu}0.5\%} = 1.005^{-5} \cdot 100000 \cdot \ddot{a}_{\bar{\nu}} \approx 357,447.59. \]

From this

\[ \ddot{s}_{\bar{\nu}0.5\%} = 1.005^{-5} \cdot \ddot{a}_{\bar{\nu}} \cdot 100 \approx 357,447.59. \]

Using a financial calculator we get \( n \approx 204.8817 \). This means that the minimum number of payments required is 205.

Answer B.