

2015 AIME I #1

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The expressions $A = 1 \times 2 + 3 \times 4 + 5 \times 6 + \cdots + 37 \times 38 + 39$ and $B = 1 + 2 \times 3 + 4 \times 5 + \cdots + 36 \times 37 + 38 \times 39$ are obtained by writing multiplication and addition operators in an alternating pattern between successive integers. Find the positive difference between integers A and B .

Write out $B - A$ as

$$\begin{array}{r} \cdots \\ - \cdots \\ \hline \cdots \\ = \cdots \end{array}$$

so that

$$B - A = 1 + 2(2 + 4 + \cdots + 38) - 39 = 4 \cdot \frac{19 \cdot 20}{2} - 38 = \boxed{722}.$$

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