

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

$$\begin{array}{cccccccccccc}
 & 1 & + & 2 \times 3 & + & 4 \times 5 & + & \cdots & + & 38 \times 39 & & \\
 - & & & 1 \times 2 & + & 3 \times 4 & + & \cdots & + & 37 \times 38 & + & 39 \\
 \hline
 & 1 & + & 2(3-1) & + & 4(5-3) & + & \cdots & + & 38(39-37) & - & 39
 \end{array}$$

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