Problem Statement: Draw the moment diagram for the fixed-end beam.

Here is the model with applied loadings:

I chose to let \( w = 1 \text{ kip/ft} \) and \( L = 12 \text{ ft} \).
Then, I performed calculations, and here is the Shear Diagram:

And this is the Moment Diagram:
This diagram has the same values as my diagram does. Max of 6 kip-ft and Min of -12 kip-ft. However the shape of the graph is reversed, for some reason. I think the software used sign conventions that say that clockwise is positive, and counter clockwise is negative. If I change the distributed loading to a positive value, the graph takes the right shape and the min/max values switch from positive to negative as well. I am not sure why this is happening unless it is because the graph has different sign conventions than I used.

Looking at the shear diagram and comparing it to the moment diagram, it seems like the first part of the curve should start negative, and then become positive, since the area of the shear diagram is positive. Here are the actual values from Robot:

<table>
<thead>
<tr>
<th>Node/Case</th>
<th>FX (kip)</th>
<th>FZ (kip)</th>
<th>MY (kip-ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1</td>
<td>0.0</td>
<td>6.00</td>
<td>-12.00</td>
</tr>
<tr>
<td>2/1</td>
<td>0.0</td>
<td>6.00</td>
<td>12.00</td>
</tr>
</tbody>
</table>

Case 1
- DL1: 0.0, 12.00, 0.0
- Sum of val.: 0.0, 12.00, -72.00
- Sum of reac.: 0.0, 12.00, -72.00
- Sum of forc.: 0.0, -12.00, 72.00
- Check val.: 0.0, 0.0, 0.0
- Precision: 0.0, 0.0, 0.0

My values are:
- $F_{z1} = 6$ (up)
- $F_{z2} = 6$ (up)
- $M_{y1} = 12$ (CCW)
- $M_{y2} = 12$ (CW)
\[ \theta_A = -\frac{wL^3}{24EI} + \frac{mL}{3EI} + \frac{mB}{6EI} = 0 \]

\[ M_A = M_B \quad \text{(symmetry)} \]

\[ \frac{ML}{2EI} = \frac{WL^3}{24EI} = 0 \quad \Rightarrow \quad M = \frac{wL^2}{12} \]

\[ \begin{align*}
\Sigma F_y &= V_A - V_B - wL = 0 \\
\Sigma M_A &= M_A - \frac{wL^2}{2} - M_B - V_B L = 0 \\
V_B &= -\frac{wL^2}{2L} = 0 \\
V_B &= -\frac{wL}{2} \\
V_A &= wL + V_B = wL - \frac{wL}{2} = \frac{wL}{2} \\
\end{align*} \]