A tank initially contains 100 lb of salt in 800 gal of water. Salt-water containing 1 lb of salt/gal enters tank at rate of 4 gal/min. Mixture is removed at same rate. How many lbs of salt in the tank after 2 hrs?

\[
\text{\underline{Input}}
\]

<table>
<thead>
<tr>
<th>Salt</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 lb</td>
<td>4 gal</td>
</tr>
</tbody>
</table>

\[
\text{\underline{Output}}
\]

<table>
<thead>
<tr>
<th>Salt</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S(t))</td>
<td>800</td>
</tr>
</tbody>
</table>

\[
\frac{S}{200} = \frac{4S(t)}{800} = 4
\]
\[ S' = -\frac{S}{200} + 4 \]

\[ S' + \frac{1}{200} S = 4 \]

\[ p(t) = \frac{1}{200} \quad q(t) = 4 \]

\[ F(t) = \int p(t) \, dt = \int \frac{1}{200} \, dt = \frac{t}{200} \]

\[ g(t) = e^{F(t)} = e^{t/200} = e^{0.005t} \]

\[ \int g(t) q(t) = \int 4 e^{0.005t} \, dt \]

\[ = \frac{4 e^{0.005t}}{0.005} + C = 800 e^{0.005t} + C \]

\[ S(t) = S(t) = \frac{800 e^{0.005t}}{e^{0.005t}} + C \]

\[ S(t) = 800 + C e^{-0.005t} \]

\[ 100 = S(0) = 800 + C \]

\[ C = -700 \]

\[ S(t) = 800 - 700 e^{-0.005t} \]

\[ S(120) = 800 - 700 e^{-0.6} \]

\[ \approx 45.8 \text{ lb} \]