Show all work for full credit, and use correct notation. Simplify answers completely.

The non-zero transition rates for a 4-state model are:

\[ \mu^{01}_x = .04 \]
\[ \mu^{02}_x = .02 \]
\[ \mu^{21}_x = .01 \]
\[ \mu^{23}_x = .03 \]
\[ \mu^{13}_x = .001 e^{0.1x} = \mu^{31}_x \]

Determine

1. \[ 10p^{12}_{30} \]

2. Show that \[ 10p^{00}_{30} = e^{-0.6} \approx 0.5488 \]

3. Show that \[ 10p^{02}_{30} = e^{-0.4} - e^{-0.6} \approx 0.1215 \]
You are also given $10p_{30}^{0.1} \approx 0.2587$ and $10p_{30}^{0.3} \approx 0.0710$.

4. Determine $10p_{30}^{0.3}$

5. Use Euler’s Forward Equation with step size equal to 0.2 to approximate $10.2p_{30}^{0.3}$