Separate variables and use partial fractions to solve
\[
\frac{dx}{dt} = 4x(7-x), \quad x(0) = 11
\]
Sketch the graphs of several solutions, and highlight the indicated particular solution.

\[
\frac{dx}{dt} = 4x(7-x)
\]

\[
\frac{dx}{4x(7-x)} = dt
\]

\[
\frac{1}{4x(7-x)} = \frac{1}{7x} + \frac{1}{28(7-x)}
\]

\[
\int\frac{1}{7x} + \frac{1}{28(7-x)} \, dx = \int dt
\]

\[
\frac{1}{7} \ln|x| - \ln|7-x| = 7t + C
\]

\[
\left|\frac{x}{x-7}\right| = Ce^{7t}
\]

\[
x(0) = 11
\]

\[
\frac{11}{4} = C
\]

\[
\frac{x}{x-7} = \frac{11}{4} e^{7t}
\]

\[
x = 11 \left(\frac{x-7}{e^{7t}}\right)
\]

\[
x = 11e^{7t} x - 77e^{7t}
\]

\[
x = -77e^{7t}
\]

\[
x(t) = \frac{77e^{7t}}{11 - 1 - 28t}
\]
Graph:

From Book