1. The amount in her account $t$ years from now is given by $A(t) = 600e^{0.045t}$.

A. Letting $t = 9$, we find that her account will have $899.58 in 9 years.

B.

\[
1500 = 600e^{0.045t} \\
2.5 = e^{0.045t} \\
\ln 2.5 = 0.045t \\
t = \frac{\ln 2.5}{0.045} \approx 20.4
\]

It will take approximately 20.4 years for the balance in her account to reach $1500.

2. A function which grows exponentially can be written as $A = A_0e^{rt}$.

\[
3A_0 = A_0e^{6r} \\
3 = e^{6r} \\
\ln 3 = 6r \\
r = \frac{\ln 3}{6} \approx 0.1831
\]

\[
A \approx A_0e^{0.1831t}
\]

\[
2A_0 \approx A_0e^{0.1831t} \\
2 \approx e^{0.1831t} \\
\ln 2 \approx 0.1831t \\
t \approx \frac{\ln 2}{0.1831} \approx 3.8 \text{ hours}
\]

3. (a) From the graph of $C(q)$ we see that $C(0) = 3000$, so the fixed costs are $3000.

(b) From the graph, we see that the points $(0, 3000)$ and $(80, 5000)$ are on this line. We compute the slope to be 25. The formula for the line is then $C(q) = 25q + 3000$.

(c) The revenue function is given by $R(q) = 100q$. Its graph is a line which goes through the origin and the top right corner of the grid shown.

(d) If your graphs are drawn carefully, you can see that the break-even point occurs when the graphs intersect at $q = 40$. You can also set revenue equal to cost to obtain

\[
100q = 25q + 3000 \\
75q = 3000 \\
q = 40
\]