(a) Determine the QR decomposition of the following \( n \times 2 \) matrix:

\[
A = \begin{bmatrix}
1 & a_1 \\
1 & a_2 \\
\vdots & \vdots \\
1 & a_n
\end{bmatrix}
\]

where \( a_1, \ldots, a_n \) are numbers (not all equal).

(b) Compute \( R^{-1}Q^T \). (Check your answer against Example 5 on pp. 243–4.)

Section 5.4: 20, 32, and 36.

Find parameters \( c \) and \( d \) so that the model

\[
y = c2^t + d3^t
\]

best fits the following measurements:

\[
\begin{array}{c|ccc}
\hline
\text{t} & 0 & 1 & 2 \\
\hline
\text{y} & 31 & 31 & 93 \\
\hline
\end{array}
\]

(a) Find an orthonormal basis for the kernel of the following matrix:

\[
A = \begin{bmatrix}
1 & 1 & 2 \\
1 & 2 & 3 \\
1 & 2 & 4
\end{bmatrix}
\]

(b) Find all possible solutions to

\[
A\vec{x} = \begin{bmatrix}
0 \\
11
\end{bmatrix}
\]

(c) Find the solution \( \vec{x} \) to the above that minimizes \( \|\vec{x}\| \).

Section 5.3: 5–11, 50, 68.

Chapter 5 true/false problems (p. 263): 16, 18, 20, 29 and 36.