4.24 \hspace{1cm} \begin{align*} X &= \text{wine intake of middle-aged British women (grams/day)} \\ Y &= \text{breast cancer rates in drinkers relative to nondrinkers} \end{align*}

\begin{table}[h]
\begin{tabular}{|c|c|c|c|c|}
\hline
X & 2.5 & 8.5 & 15.5 & 24.5 \\
\hline
Y & 1.00 & 1.08 & 1.15 & 1.22 \\
\hline
\end{tabular}
\end{table}

a) \hspace{1cm} \begin{align*}
\text{(relative rate)} \\
1.3 & \hspace{1cm} \bullet \\
1.2 & \hspace{1cm} \bullet \\
1.1 & \hspace{1cm} \bullet \\
1.0 & \hspace{1cm} \bullet \\
\end{align*}

\begin{itemize}
\item i. \(X\) and \(Y\) are correlated;
\item ii. Linearly correlated;
\item iii. Positive association;
\item iv. Very strong correlation;
\item v. No outliers.
\end{itemize}

b) \hspace{1cm} \begin{align*}
calculator & \Rightarrow \quad r = 0.9851 \\
\text{very strong linear correlation with positive association.}
\end{align*}

Thus, these data provide strong evidence to conclude that as the consumption of alcohol increases, so does the rate of occurrence of breast cancer.

4.31

\begin{align*} X &= \text{wine intake of middle-aged British women (grams/day)} \\ Y &= \text{breast cancer rate in drinkers relative to nondrinkers} \\
X' &= \text{alcohol intake (other than wine) in the same population} \\
Y' &= \text{breast cancer rate in drinkers relative to nondrinkers} \end{align*}

\begin{table}[h]
\begin{tabular}{|c|c|c|c|c|}
\hline
X & 2.0 & 7.0 & 13.0 & 24.0 \\
\hline
Y & 0.96 & 1.06 & 1.11 & 1.20 \\
\hline
\end{tabular}
\end{table}
i. Both scatterplots show $X \& Y$ and $X' \& Y'$ are correlated;

ii. Both correlations are linear;

iii. Both correlations have positive association;

iv. Both correlations are very strong;

v. No outliers for either scatterplots.

\[
\begin{align*}
\text{For } (X, Y) &: \quad r = 0.9851 \\
\text{For } (X', Y') &: \quad r = 0.9756
\end{align*}
\]

which imply very strong linear correlation with positive association for both correlations.