1. Cholesterol levels for men are normally distributed with $\mu \approx 190$. But a sampling of 16 men gave $\bar{x} = 184$ with $S = 12$. Is there evidence, with level of significance $\alpha = 0.05$, to conclude that the mean cholesterol level for men differs from 190?

(a) State the null hypothesis and a one-sided alternative, and explain what test to use.

(b) Use the table below to find the endpoint of the rejection region for your one-sided test in Part (a). Show it on a shaded graph and label the distribution used.

\[
\begin{array}{c|c|c|c|c}
\text{deg. of fr.} & 0.90 & 0.95 & 0.98 & 0.99 \\
\hline
15 & 1.753 & 2.131 & 2.602 & 2.947 \\
16 & 1.746 & 2.120 & 2.583 & 2.921 \\
17 & 1.740 & 2.110 & 2.567 & 2.898 \\
\end{array}
\]

(c) Use the $P$-value to explain your conclusion in detail.

(d) Show how to find the test statistic used for your test in Part (a). Explain the conclusion in terms of the test statistic.
2. Cholesterol levels among women are also normally distributed with $\mu \approx 170$. A sampling of 20 women gave $\bar{x} = 171$ with $S = 14.6$.

Is there evidence, with level of significance $\alpha = 0.05$, to conclude that the mean cholesterol level for women differs from 170?

(a) State the null hypothesis and a one-sided alternative, and explain what test to use.

(b) Use the table below to find the endpoint of the rejection region for your one-sided test in Part (a). Show it on a shaded graph and label the distribution used.

<table>
<thead>
<tr>
<th>deg. of fr.</th>
<th>0.90</th>
<th>0.95</th>
<th>0.98</th>
<th>0.99</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>1.734</td>
<td>2.101</td>
<td>2.552</td>
<td>2.878</td>
</tr>
<tr>
<td>19</td>
<td>1.729</td>
<td>2.093</td>
<td>2.539</td>
<td>2.861</td>
</tr>
<tr>
<td>20</td>
<td>1.725</td>
<td>2.086</td>
<td>2.528</td>
<td>2.845</td>
</tr>
</tbody>
</table>

(c) Use the $P$-value to explain your conclusion in detail.

(d) Show how to find the test statistic used for your test in Part (a). Explain the conclusion in terms of the test statistic.
3. Baby birth weights are normally distributed with $\mu \approx 7$ lbs and $\sigma = 2$ lbs. A sampling of 30 newborns gave $\bar{x} = 6.95$ with $S = 1.95$.

Is there evidence, with level of significance $\alpha = 0.05$, to conclude that the mean baby birth weight differs from 7 lbs?

(a) State the null hypothesis and a one-sided alternative, and explain what tests can be used.

(b) Use a $P$-value to explain your conclusion in detail.