1. Exercise 10.4 in the text.

   Solution:

   a. $P(3 \text{ or fewer}, p = 0.6) = 0.0548$

   b. $1 - P(3 \text{ or fewer}, p = 0.3) = 1 - .6496 = .3504$

   $1 - P(3 \text{ or fewer}, p = 0.4) = 1 - .3823 = .6177$

   $1 - P(3 \text{ or fewer}, p = 0.5) = 1 - .1719 = .8281$

2. Exercise 10.12 in the text. You should use the normal distribution to approximate the binomial (you do not need to use the continuity correction).

   Solution:

   a. $60\% * 400 = 240$, $\sigma = \sqrt{400 * .6 * .4} = 9.8$. $P(X \leq 220) + P(X \geq 260) = 2P(Z \leq \frac{220-240}{9.8}) = 0.0414$.

   b. $P(X \leq 260) - P(X \leq 220) = P(Z \leq \frac{68}{9.8}) - P(Z \leq \frac{28}{9.8}) \approx 1 - .9978 \approx 0$.

3. Exercise 10.14 in the text.

   Solution:

   a. $P(Z \leq \frac{14.9-15}{.5/\sqrt{50}}) = 0.0793$

   b. $1 - P(Z \leq \frac{14.9-14.8}{0.0707}) = 0.0793$

1

$1 - P(Z \le \frac{14.9-14.9}{0.0707}) = 0.50$

4. Exercise 10.26 in the text.

   Solution:

   $\frac{244-220}{24.5/\sqrt{20}} = 4.38$ Reject H_0.

5. Exercise 9.72 in the text.

   Solution:

   $P(\frac{(n-1)s^2}{\chi^2_{.01,19}} < \sigma^2 < \frac{(n-1)s^2}{\chi^2_{.99,19}}) = .98$

   $(\frac{19*16}{36.191}, \frac{19*16}{7.633}) = (8.4, 39.83)$

6. Guided R exercise.

   In this exercise, you will use R functions to carry out your calculations for problem 10.26. You may find the functions pt and qt to be helpful. These functions give the cumulative probability density and the percentiles of t distributions. In the R console, type the command ?pt to display information about these functions. Using R, carry out the test and calculate the power of the test assuming $\mu = 240$.

   Solution:

   ```
   > t.05.19 = qt(.95, 19)
   ```

```
> t.05.19

[1] 1.729133

> pivot = (244-220)/(24.5/sqrt(20))

> pivot

[1] 4.380868

> pivot > t.05.19

[1] TRUE

> reject = t.05.19*24.5/sqrt(20) +220

> reject

[1] 229.4728

> tcrit.power = (reject - 240)/(24.5/sqrt(20))

> tcrit.power

[1] -1.92159

> power = 1-pt(tcrit.power, 19)

> power

[1] 0.9651067

>
```

Reject H_0.