[redacted]

11.1(a): 0.983

11.1(b): $\hat{y} = 34.5 + 0.95x$

11.1(d): 0.950 = \$950

11.1(e): 34.5 = \$34500

11.1(f): 45.9 = \$45900

11.1(g): 40.2 = \$40200

11.1(h): $(38.957, 41.443)$

11.1(i): $t^* = 10.82$, $t_{\alpha/2,n-p} = t_{0.025,4} = 2.776$, reject H_0, there is a significant linear relationship between years of experience and salary.

11.1(j): $2P(t_{(n-p)} > |t^*|) = 2P(t_{(4)} > 10.82) < 0.001$, significant linear relationship since the $p-$value is less than α.

11.1(k): 0.00042

11.1(l): $(0.706, 1.194)$, significant linear relationship since the CI excludes 0.

11.1(m): $(31.94, 37.06)$

11.1(n): Yes, since the CI for β_0 excludes 40.

11.1(o): 96.7% of the variability in salaries is explained by the linear relationship with years of experience.

11.2(a): Every extra percent of ethanol reduces mileage by approximately 0.25, on average.

11.2(b): The estimated mean mileage when no ethanol is used is 32.96.

11.2(c): $t^* = -5.15$, $P(t_{(5)} < -5.15) \in (0.001, 0.0025)$, ethanol significantly decreases the mean mileage.

11.2(d): 31.214

11.2(e): $(30.68, 31.75)$, we are 95% confident that the mean mileage when using 7% ethanol is between 30.68 and 31.75.

11.2(f): $(-0.375, -0.125)$, we are 95% confident that the mean decrease in mileage for each extra percent of ethanol is between −0.375 and −0.125.

11.3(a): Test $H_0 : \beta_1 = 0$ versus $H_a : \beta_1 \neq 0$, $t^* = 5.59$, $p-\text{value} \in (0.002, 0.005)$.

11.3(b): $(15.95, 17.37)$

11.3(c): Yes, since the CI for $\mu_{y|x=200}$ lies entirely below 20.

11.4(a): $\bar{y}_F = 34.0$, $\bar{y}_M = 30.6$

11.4(b): 0.983

11.4(c): $\text{Cov}(x_M, y_M) = 4.75$

11.4(d): $\hat{y}_F = 24.5 + 0.95x$, $\hat{y}_M = 25.85 + 1.1875x$

11.4(f): Males make 1.3 = \$1300 more than females for starting pay, on average.

11.4(g): Males get \$1187.5 extra per year on average, females get \$950 extra per year on average.

11.4(h): 32.975 − 30.2 = 2.775 = \$2775

11.4(i): The overall mean years of experience is $\bar{x} = 80/11 = 7.27$. When $x = 7.27$ we have $\hat{y}_F = 31.407$ and $\hat{y}_M = 34.483$.

11.4(j): 34.483 − 31.407 = 3.076 = \$3076. After adjusting for years of experience, males make \$3076 more than females, on average.

11.4(k): No, since the unadjusted salaries do not account for years of experience. The adjusted mean salaries account for years of experience and therefore we can make a meaningful comparison between the male and female adjusted mean salaries.