(1) (a) Sex_age = 4 sex_age groups – 1 = 3
Error = (10-1) + (8-1) + (6-1) + (9-1) = 29
Total = 33 - 1 = 32. Check: 3 + 29 = 32.

(b) p = 0.0022 < 0.05 \rightarrow sex_age effect is statistically significant at the \alpha=0.05 level.

(c) \frac{10(2.60 - 2.34)^2 + 8(2.25 - 2.34)^2 + 6(2.21 - 2.34)^2 + 9(2.22 - 2.34)^2}{3}

(d) \frac{9*0.31^2 + 7*0.16^2 + 5*0.11^2 + 8*0.22^2}{29}

(e) 
\hat{i} = 0.5*2.60 + 0.5*2.25 - 0.5*2.21 - 0.5*2.22
\hat{\nu}(\hat{i}) = 0.054 \left( \frac{(0.5)^2}{10} + \frac{(0.5)^2}{8} + \frac{(-0.5)^2}{6} + \frac{(-0.5)^2}{9} \right)
\hat{i} \pm 2.045 \sqrt{\hat{\nu}(\hat{i})}

(f) SE in ln scale = relative error in original scale
SE in original scale \approx 7.5\% of the mean = 13.5*0.073 = 0.9855
OR \ g(\mu) = e^\mu \quad g'(\mu) = e^\mu \quad SE\left(e^\bar{X}\right) \approx |e^\mu|SE\bar{X} \approx e^{2.60} * 0.073

(g) \frac{e^{2.60-2.25}}{e^{2.25}} or \frac{e^{2.60}}{e^{2.25}}

(h) We do not have strong evidence that the two means are exactly the same. No difference is one of the possibilities that cannot be eliminated, but so is a difference of 0.1 like the sample means or for that matter any difference included in a confidence interval.

(i) Power = probability of rejecting \text{H}_0 when \text{H}_0 is false.

(j) \quad \text{power} = 0.95 \quad \beta = 0.05 \quad \alpha = 0.01
\quad n = \frac{(2.576+1.645)^2 * 2 * 0.054}{0.2^2}
(k) Check in which scale the data are more normally distributed. Draw 2 plots, one for the original scale and one for the ln scale. On each plot draw separate normal plots for each group as with the EPA fish data. Straight lines will indicate normal data.

(2) These are PAIRED data. \( \bar{d} \pm 2.571 \frac{s_d}{\sqrt{6}} \)