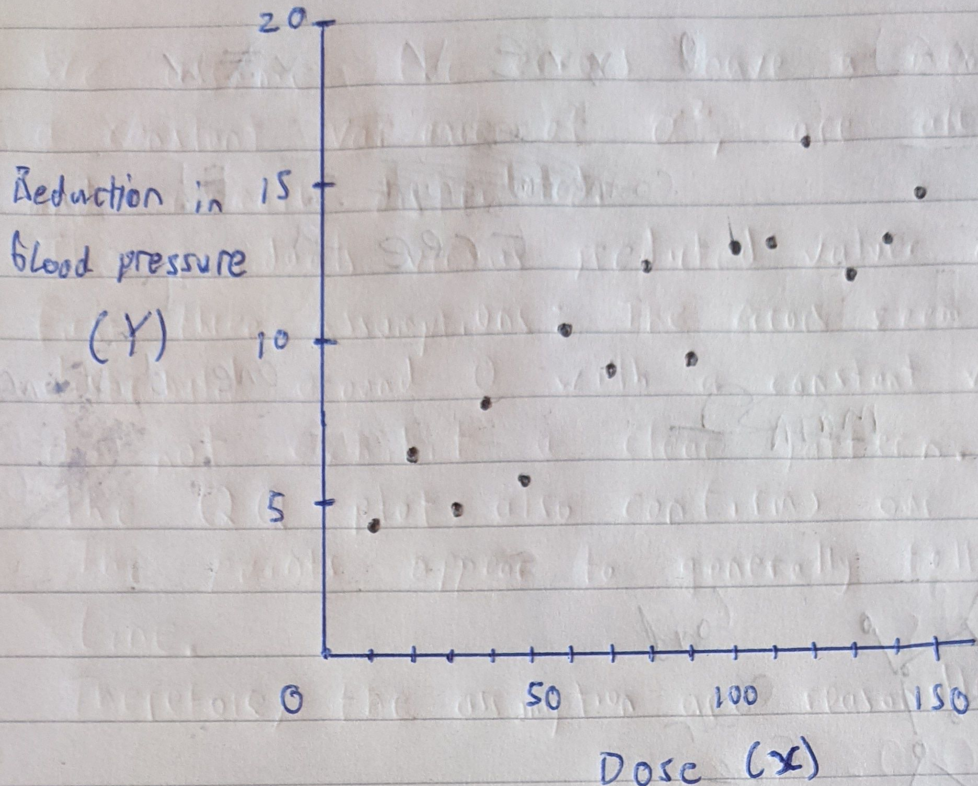
Ted Johnson

1 (a)



From this sketch, it does appear that the mean value of Y depends on x.

(b) $n = 15$, $\bar{x} = 80$, $\bar{y} = 10.1733$

$$\sum_{i=1}^{n} x_i y_i = 14179$$

$$\sum_{i=1}^{n} x_i^2 = 124000$$

$$\hat{\beta}_1 = \frac{14179 - (15)(80)(10.1733)}{124000 - (15)(80^2)} = 0.071$$

$$\hat{\beta}_0 = 10.1733 - (0.071)(80) = 4.4933$$

$$\therefore \hat{y} = 4.4933 + 0.071x$$

(c) • Slope interpretation ($\hat{\beta}_1$):

The estimated average reduction in blood pressure per number of doses is 0.071.

• Intercept inerpretation ($\hat{\beta}_0$):

The estimated average reduction in blood pressure without any doses is 4.4933

(d) Estimate of $\sigma^2 = \hat{\sigma}^2 = \frac{1}{n-2}\sum_{i=1}^{n}(Y_i - \hat{Y}_i)^2$

$= \frac{1}{13}(38.675) = 2.975$

The estimated average variance of the error term is 2.975, which indicates the observations lie within 2.975 units from our fitted model.

(e) We assume the errors have a mean of 0, a constant variance of σ^2, are all independent and normally distributed.
The residuals versus predicted values confirms our first three assumptions: The errors seem to be distributed around 0 with a constant variance and do not exhibit a clear pattern.
The QQ plot also confirms our final assumption: The points appear to generally follow the plotted line.
Therefore, the assumption are reasonable.