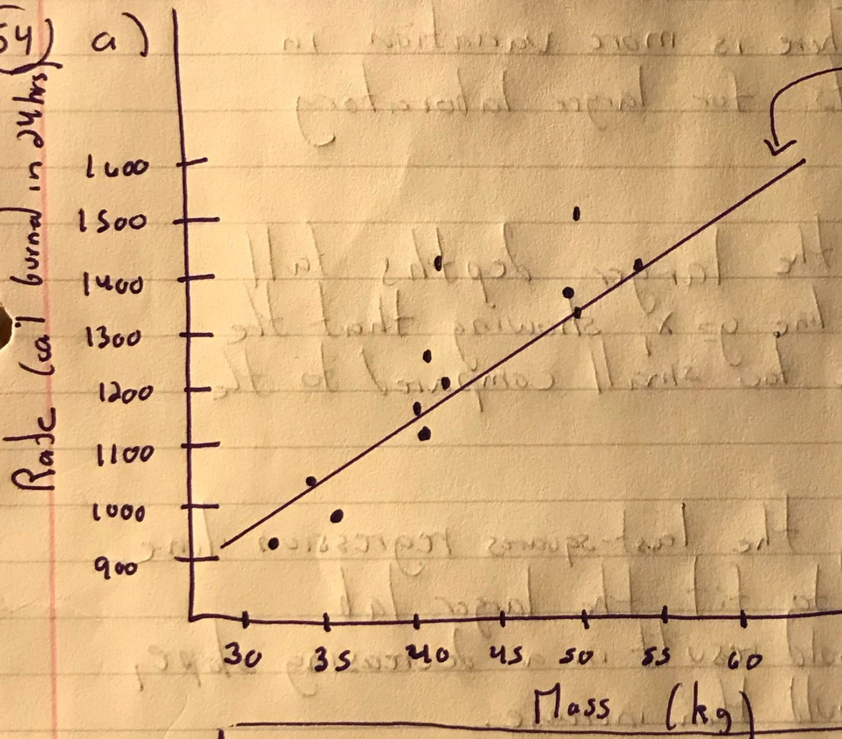
HW 3.2 Part C pages 192-194 problems 49, 54, 56, 58-61

(49) a) Since $r = 0.5$, $r^2 = (0.5)^2 = 0.25$. This means 25% of the variation in the husbands' heights is accounted for by the regression line.

b) $s = 1.2$. When using the line of prediction, the average error (residual) is 1.2 inches.

(54) a)

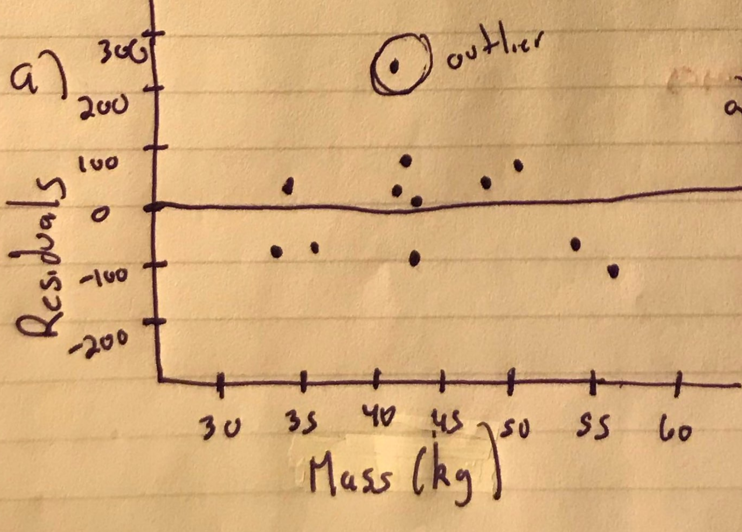


b) $\hat{y} = 201.2 + 24.026x$

c) The slope is 24.026. For every increase in mass of 1 kg, the predicted rate of calories burned per 24 hours is 24.026.

d) $\hat{y} = 201.2 + 24.026(45)$
$= 1282.37$ cal/day

(56) a)



a) The residual plot does not show a pattern, ∴ the linear fit is good. There is 1 large positive residual of about 200. The outlier is near the mean of the mass value ($\bar{x} \approx 43$ kg), so it does not influence the line very much.

b) The point (42, 1418) has the largest residual of ≈ 200. This means the regression line underpredicted the metabolic rate by ≈ 200 cal/day.

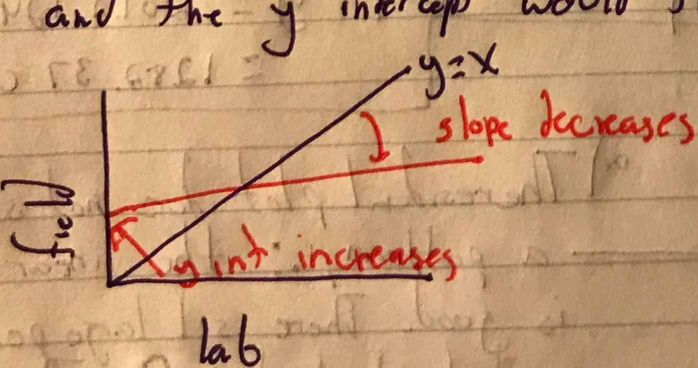
(58) $r^2 = 0.768$ and $s = 95.08$

a) If $r^2 = 0.768$, this means 76.8% of the variation in the Metabolic rate is accounted for by the regression line. If $s = 95.08$, this means the average error (residual) when using the line for predictions is 95.08 calories burned/24 hours.

(59) a) There is a positive, linear association between the 2 variables. There is more variation in the field measurements for larger laboratory measurements.

b) The points for the larger depths fall systematically below the line $y = x$, showing that the field measurements are too small compared to the lab measurements.

c) To fit the data, the least-squares regression line would be pulled down to fit the larger lab measurements which would result in a decreasing slope, and the y intercept would then increase.



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(60) The residual plot clearly shows that the prediction errors increase for larger laboratory measurements.

(61) No it would not be appropriate to use the least squares regression line to model this data because the residual plot shows a clear, curved pattern.