Group 3

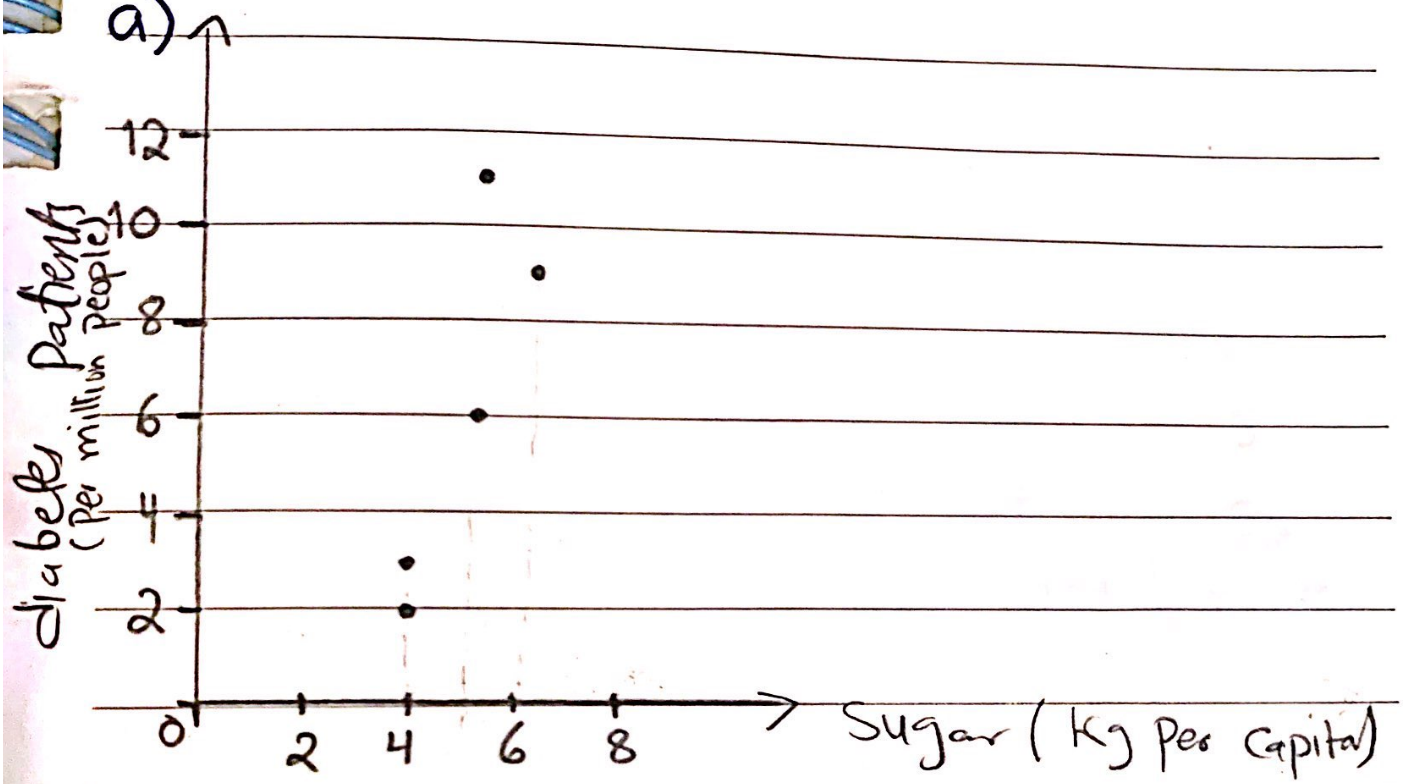
1. Heng Xing Yu A21EC0183
2. Gon Jia Hui A21EC0177
3. Tan Kai Yuan A21EC0230
4. Sondos Tamer Mustafa A21EC0277

Sondos Tamer Moustafa A21EC0277 Section 7

Assignment 4 PSDA

Q1

a)



as sugar consumption increases, the ~~de~~ number of diabetes patients increases. The plot seems to have a positive correlation.

b) Yes, there appears to be a moderate Positive relationship between the number of diabetes patients and the sugar consumption.

c)

x	y	x^2	y^2	$x.y$
5	6	25	36	30
6	9	36	81	54
4	3	16	9	12
4	2	16	4	8
5	11	25	121	55
$\Sigma x = 24$	$\Sigma y = 31$	$\Sigma x^2 = 118$	$\Sigma y^2 = 251$	$\Sigma xy = 159$

$$r = \frac{\Sigma xy - (\Sigma x . \Sigma y)/n}{\sqrt{[(\Sigma x^2) - (\Sigma x)^2/n]\,[(\Sigma y^2) - (\Sigma y)^2/n}}$$

$$r = \frac{(159) - (24)(31)/5}{\sqrt{[118 - 24^2/5]\,[251 - 31^2/5]}}$$

$= 0.79494$

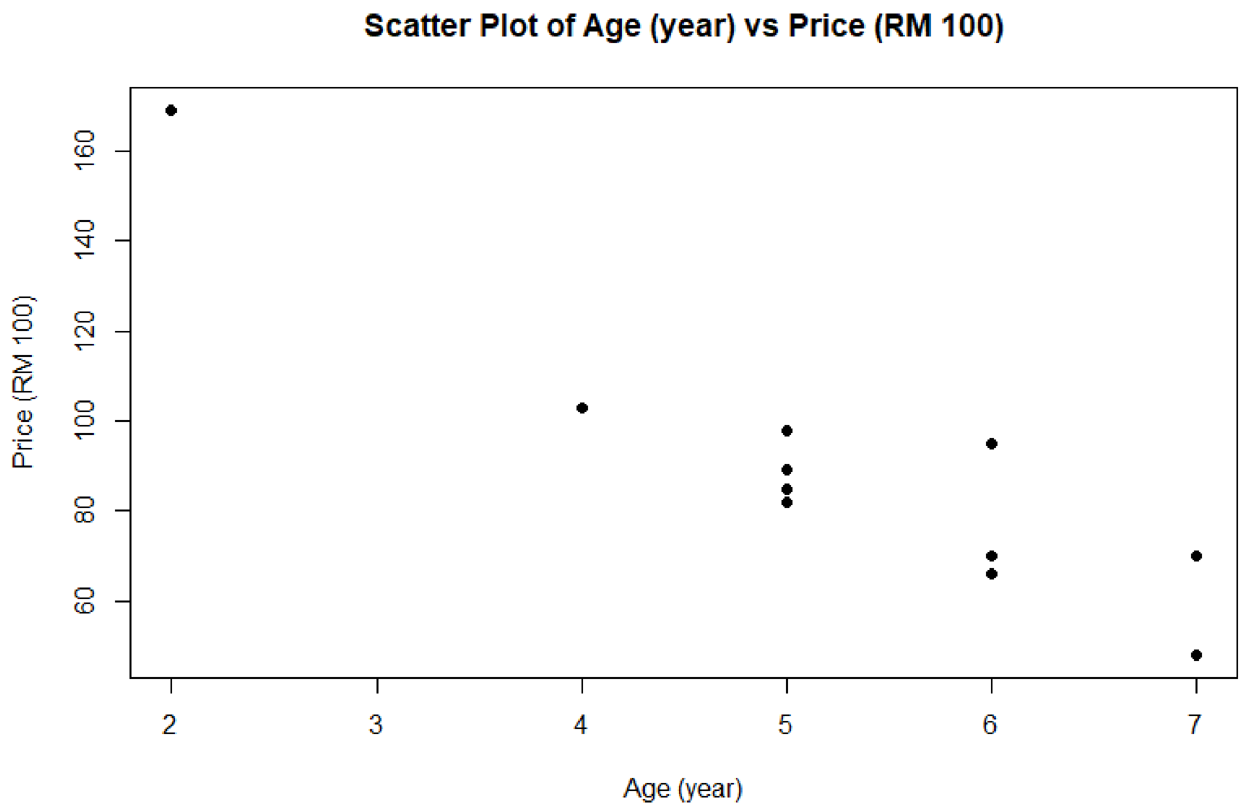
DATE. PAGE.

Yes, the value of the correlation coefficient is consistent with my answer in b as $r = 0.7949$ indicates a moderate positive relationship.

d) Yes it is reasonable, since both the scatter plot and coefficient indicate a positive relationship

Tan Kai Yuan
A21EC0230

2. a)



b)

Tan Kai Yuan
A21EC0230

Date No.

c) The apparent relationship between age and price are negative linear relationship.

d) $\Sigma x = 58$ $n = 11$

$\Sigma y = 975$ $\bar{x} = 5.2727$

$\Sigma xy = 4732$ $\bar{y} = 88.6364$

$\Sigma x^2 = 326$

$$b_1 = \frac{\Sigma xy - \frac{\Sigma x \Sigma y}{n}}{\Sigma x^2 - \frac{(\Sigma x)^2}{n}}$$

$$= \frac{4732 - 5140.9091}{326 - 305.8181}$$

$$= -20.2612$$

$$b_0 = \bar{y} - b_1 \bar{x}$$

$$= 88.6364 - (-20.2612)(5.2727)$$

$$= 195.4676$$

$$\therefore \hat{y} = 195.4676 - 20.2612x$$

e) $\hat{y}_3 = 195.4676 - 20.2612(3)$

$= 134.684$

$\hat{y}_4 = 195.4676 - 20.2612(4)$

$= 114.4228$

Tarikh :

3. a) $H_0 : \mu_1 = \mu_2 = \mu_3$

H_1 : at least one mean is different

b) Product A

$n = 5$

$\bar{x} = \frac{210 + 240 + 270 + 270 + 300}{5}$

$= 258$ *

$\sigma^2 = \frac{(210-258)^2 + (240-258)^2 + (270-258)^2 + (270-258)^2 + (300-258)^2}{5-1}$

$= 1170$ *

$S = \sqrt{1170}$

$= 34.21$

Product B

$n = 5$

$\bar{x} = \frac{210 + 240 + 240 + 270 + 270}{5}$

$= 246$ *

$\sigma^2 = \frac{(210-246)^2 + (240-246)^2 + (240-246)^2 + (270-246)^2 + (270-246)^2}{5-1}$

$= 630$ *

$S = \sqrt{630}$

$= 25.10$

Product C

$n = 5$

$\bar{x} = \frac{180 + 210 + 210 + 210 + 240}{5}$

$= 210$ *

$\sigma^2 = \frac{(180-210)^2 + (210-210)^2 + (210-210)^2 + (210-210)^2 + (240-210)^2}{5-1}$

$= 450$ *

$S = \sqrt{450}$

$= 21.21$

Tarikh :

c) $\bar{\bar{x}} = \frac{258 + 246 + 210}{3}$

$= 238$

$S_{\bar{x}} = \sqrt{\frac{(258-238)^2 + (246-238)^2 + (210-238)^2}{3-1}}$

$= 24.98$

$ns^2_{\bar{x}} = 5(24.98)^2 = 3120$

$S_p^2 = \frac{(34.21)^2 + (25.10)^2 + (21.21)^2}{3}$

$= 750.67$

$F = \frac{ns^2_{\bar{x}}}{S^2_p} = \frac{3120}{750.67} = 4.16$ *

d) Numerator $= 3-1 = 2$
Denominator $= 3(5-1) = 12$

e) F critical value $= 3.89$

f) • Since $F_{\text{test statistic}} > F_{\text{critical value}}$ $(4.16 > 3.89)$, we have enough evidence to reject the null hypothesis.

• There is sufficient evidence to claim that the different size of product have at least one mean is different after the treatment.