CEU Universidad San Pablo

Facultad de Medicina

CARRERA PHYSIOTHERAPY			
APELLIDOS		NOMBRE	
ASIGNATURA STATISTICS (DESCRIPTIVE STAT.)		FECHA 2019/05/27	GRUPO
CALIFICACIÓN			

1-a) $\bar{x} = \frac{91}{12} = \boxed{7.5833}$ cig $\quad S_x^2 = \frac{809}{12} - 7.5833^2 = \boxed{9.9097}$ cig^2

0.25 0.25

$\bar{y} = \frac{33.26}{12} = \boxed{2.7717}$ kg $\quad S_y^2 = \frac{92.9708}{12} - 2.7717^2 = 0.0654$ kg^2

0.25

$S_{xy} = \frac{243.61}{12} - 7.5833 \cdot 2.7717 = \boxed{-0.7176}$ cig·kg

0.25

REGRESSION LINE Y ON X : $y = 2.7717 - \frac{0.7176}{9.9097}(x - 7.5833) = \boxed{-0.0724x + 3.3208}$

0.5

$b_{yx} = \boxed{-0.0724}$ ⇒ The weight decreases 0.0724 kg per cigarette smoked

0.25 0.25

b.) $\overline{\log(x)} = \frac{23.0317}{12} = \boxed{1.9193}$ log(cig) $\quad S^2_{\log(x)} = \frac{47.196}{12} - 1.9193^2 = \boxed{0.2492}$ $\log^2$(cig)

0.25 0.25

$\overline{\log(y)} = \frac{12.1857}{12} = \boxed{1.0155}$ log(kg) $\quad S^2_{\log(y)} = \frac{12.4665}{12} - 1.0155^2 = \boxed{0.0077}$ $\log^2$(kg)

0.25 0.25

$S_{x\log(y)} = \frac{89.3984}{12} - 7.5833 \cdot 1.0155 = \boxed{-0.2508}$ cig · log(kg)

0.25

$S_{\log(x) \cdot y} = \frac{62.3428}{12} - 1.9193 \cdot 2.7717 = \boxed{-0.1245}$ (cig.) kg.

0.25

$r^2_{\log} = \frac{S^2_{\log(x)y}}{S^2_{\log(x)} \cdot S_y^2} = \frac{(-0.1245)^2}{0.2492 \cdot 0.0654} = \boxed{0.9499}$

0.25

$r^2_{\exp} = \frac{S^2_{x\log(y)}}{S_x^2 \cdot S^2_{\log(y)}} = \frac{(-0.2508)^2}{9.9097 \cdot 0.0077} = \boxed{0.8268}$

0.25

The logarithmic regression model fits better since r^2 is greater 0.25

c) REGRESSION LINE OF Y ON Log(x) : $y = 2.7717 - \frac{0.1245}{0.2492}(\log(x) - 1.9193) =$

$\Rightarrow \boxed{y = -0.4994 \log(x) + 3.7301}$ 0.25 → LOGARITHMIC REGRESSION MODEL

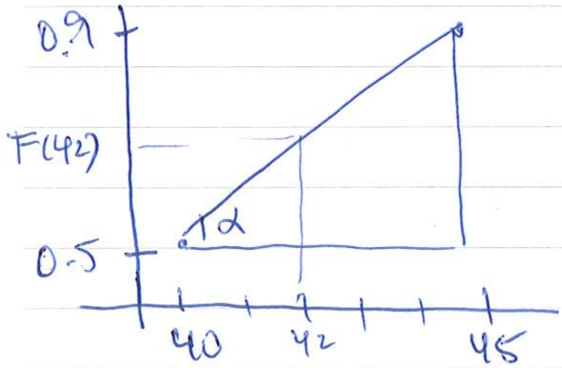
0.25 0.25

$y(12) = -0.4994 \cdot \log(12) + 3.7301 = \boxed{2.4892}$ kg It's not very reliable since the sample size is small.

2) a)

x	n_i	N_i	F_i
30-35	15	15	0.15
35-40	35	50	0.5
40-45	40	90	0.9
45-50	10	100	1

F(42)



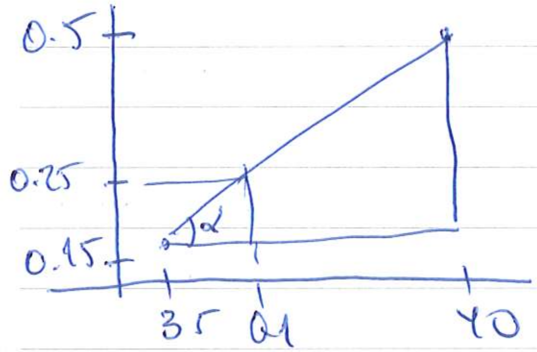
$$tg(\alpha) = \frac{0.9-0.5}{45-40} = \frac{0.4}{5} = 0.08$$

$$tg(\alpha) = \frac{F(42)-0.5}{42-40} = \frac{F(42)-0.5}{2}$$

$$F(42) = 0.5 + 2 \cdot 0.08 = \boxed{0.66} \rightarrow 66\%$$

0.5

b) $F_{Q1} = 0.25 \Rightarrow Q1 \in (35, 40)$



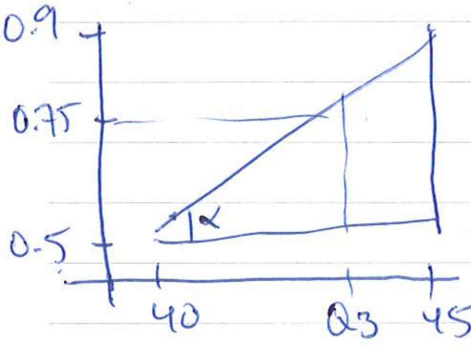
$$tg(\alpha) = \frac{0.5-0.15}{40-35} = 0.07$$

$$tg(\alpha) = \frac{0.25-0.15}{Q1-35} = \frac{0.1}{Q1-35}$$

$$Q1 = 35 + \frac{0.1}{0.07} = \boxed{36.4286} \text{ min}$$

0.5

$F_{Q3} = 0.75 \Rightarrow Q_3 \in (40, 45)$



$$tg(\alpha) = \frac{0.9-0.5}{45-40} = \frac{0.4}{5} = 0.08$$

$$tg(\alpha) = \frac{0.75-0.5}{Q_3-40} = \frac{0.25}{Q_3-40}$$

$$Q_3 = 40 + \frac{0.25}{0.08} = \boxed{43.125} \text{ min}$$

0.25

$$IQR = Q_3 - Q_1 = 43.125 - 36.4286 = \boxed{6.6964} \text{ min}$$ 0.25

0.25

Half of the central times falls in a range of 6.6964 min

c) $\bar{x} = \frac{3975}{100} = \boxed{39.75}$ min 0.25 $S_x^2 = \frac{159875}{100} - 39.75^2 = \boxed{18.6875}$ min^2

$S_x = \sqrt{18.6875} = \boxed{4.3229}$ min 0.25 $CV = \frac{4.3229}{39.75} = \boxed{0.1088}$ 0.25

$\bar{y} = 40$ $S_y = 5$ $CV_y = \frac{5}{40} = \boxed{0.125}$

Since $CV_x < CV_y$ the mean of Madrid is a little bit more representative than the mean of Paris. 0.25

d) $g_{1x} = \frac{-628.12}{100 \cdot 4.3229^3} = \boxed{-0.0778}$ 0.5

$g_{1y} = \boxed{0.75}$

Since g_{1x} is closer to 0 the distribution of times in Madrid is more simmetric 0.5

e) $Z_x(39) = \frac{39 - 39.75}{4.3229} = \boxed{-0.1735}$ 0.5

$Z_y(39) = \frac{39-40}{5} = \boxed{-0.2}$

Since $Z_x(39) > Z_y(39)$ ~~the~~ 39 min in the race of Paris is relatively smaller. 0.5