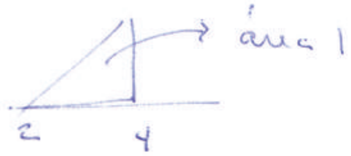
(1-) (a) $\beta_0 = -1 \; ; \; \beta_1 = 1/2$



(b) $F_X(x) = \int_2^x \left(\frac{u}{2} - 1\right) du$

Resp: $F_X(x) = \begin{cases} 1, & \text{se } x > 4 \\ \frac{(x-2)^2}{4}, & \text{se } 2 < x \le 4 \\ 0, & \text{se } x \le 2 \end{cases}$

(c) $P\{2{,}5 \le X \le 3{,}5\} = F(3{,}5) - F(2{,}5)$

$= \frac{(3{,}5-2)^2}{4} - \frac{(2{,}5-2)^2}{4} \doteq \boxed{\frac{1}{2}}$

(d) $P\{2{,}5 \le X \le 3{,}5 \mid X \le 3{,}5\} = \frac{P\{2{,}5 \le X \le 3{,}5\}}{P\{X \le 3{,}5\}}$

$= \frac{0{,}5}{\frac{2{,}25}{4}} \doteq \boxed{0{,}89}$

(e) $P\{X = 2{,}5\} = 0$

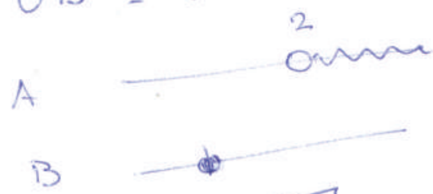
(2) $F_X(x) = \begin{cases} 1 - 0{,}75\, e^{-x}, & x \geq 0 \\ 0, & cc \end{cases}$ 2/4

$A = \{X > 2\}$ e $B = \{X = 0\}$

(a) $P(A) = 1 - P\{X \leq 2\} = 1 - F_X(2) = 1 - [1 - 0{,}75\, e^{-1}]$

$\stackrel{!}{=} \boxed{0{,}1015}$

(b) $A^c \cup B^c = (A \cap B)^c$



$A \cap B = \phi \Rightarrow (A \cap B)^c = \Omega$

$P(\Omega) = 1$

$\boxed{P(A^c \cup B^c) = 1}$

(c) $P(B/A^c) = \dfrac{P(B \cap A^c)}{P(A^c)} \stackrel{B \subset A^c}{=} \dfrac{P(B)}{P(A^c)} = \dfrac{P(X=0)}{P\{X \leq 2\}} = \dfrac{0{,}25}{1 - 0{,}1015}$

$\stackrel{!}{=} \boxed{0{,}2782}$

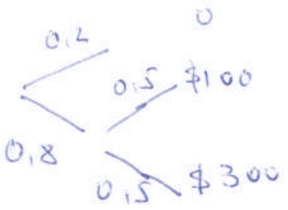
(d) $P(A/B^c) = \dfrac{P(A \cap B^c)}{P(B^c)} \stackrel{A \subset B^c}{=} \dfrac{P(A)}{P(B^c)} = \dfrac{0{,}1015}{1 - 0{,}25}$

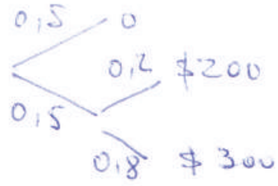
$\stackrel{!}{=} \boxed{0{,}1353}$

ou $= \dfrac{0{,}75\, e^{-2}}{0{,}75} \stackrel{!}{=} \boxed{e^{-2}}$

3

(a)





X_1	$P(x_1)$
0	0,2
100	0,8×0,5
300	0,8×0,5

X_2	
0	0,5
200	0,5×0,2
300	0,5×0,8

(b)

$E(X_1) = \$160$

$E(X_2) = \$140$

A 1ª questão a ser respondida é a questão 1

(c)

$$p_1 v_1 + p_1 p_2 v_2 \geq p_2 v_2 + p_2 p_1 v_1$$

$$p_1 v_1 - p_2 p_1 v_1 \geq p_2 v_2 - p_1 p_2 v_2$$

$$p_1 v_1 (1 - p_2) \geq p_2 v_2 (1 - p_1)$$

$$\boxed{\frac{p_1 v_1}{1 - p_1} \geq \frac{p_2 v_2}{1 - p_2}}$$

4 $f_X(x) = e^{-x}$ $Y = e^{-X}$

(a) $R_Y = (0,1]$

(b) $f_Y(y) = e^{-(-\ln x)} \left|\frac{1}{y}\right|$ $X = -\ln Y \Rightarrow \frac{dx}{dy} = \frac{1}{y}$

$= y \cdot \frac{1}{y} = 1$

$f_Y(y) = \begin{cases} 1, & 0 < x \leq 1 \\ 0, & cc \end{cases}$ $\Rightarrow Y \sim \text{uniforme}(0,1)$

(c) $\boxed{E(Y) = \frac{1}{2}}$

(d) $Z = \frac{Y - E(Y)}{\sqrt{Var(Y)}}$

$Var(Z) = Var\left(\frac{Y - E(Y)}{\sqrt{Var(Y)}}\right) = Var\left(\frac{Y}{\sqrt{Var(Y)}}\right)$

$= \frac{Var(Y)}{\left[\sqrt{Var(Y)}\right]^2} = \boxed{1}$

ou simplesmente

$\boxed{Var(Z) = 1}$

pois Z é a variável Y padronizada!