

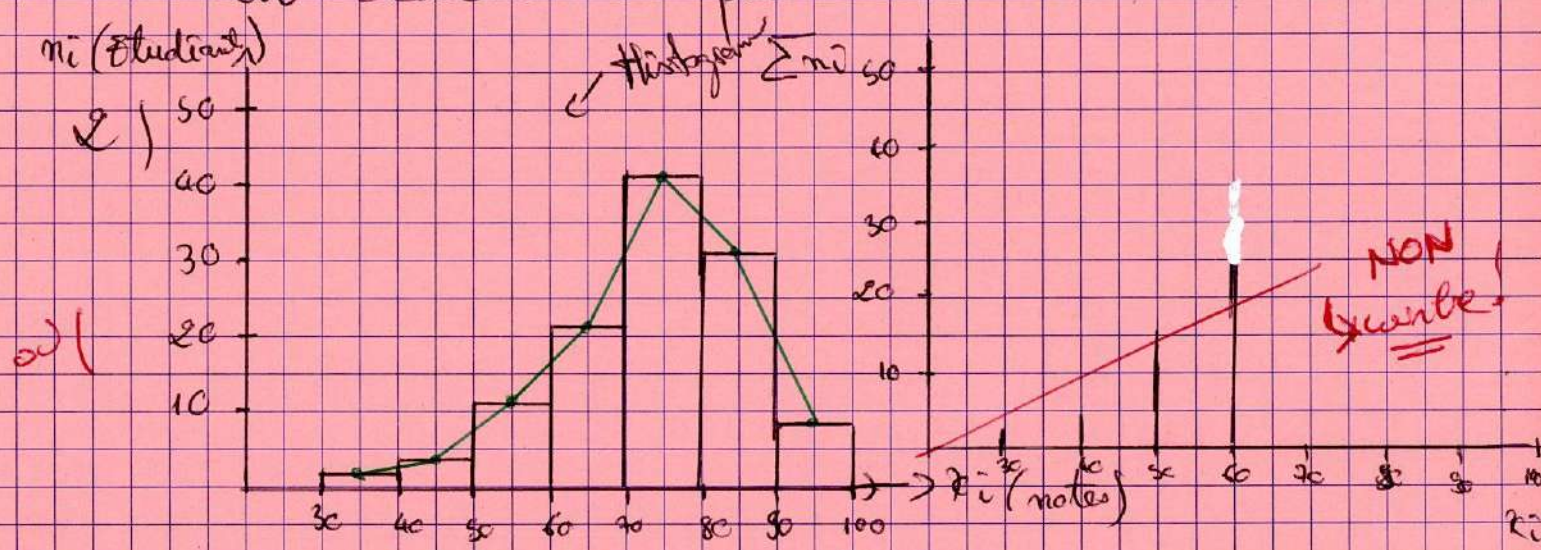
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 Promo PL2
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 PL2 - 2014

MATIÈRE PRObas - stats

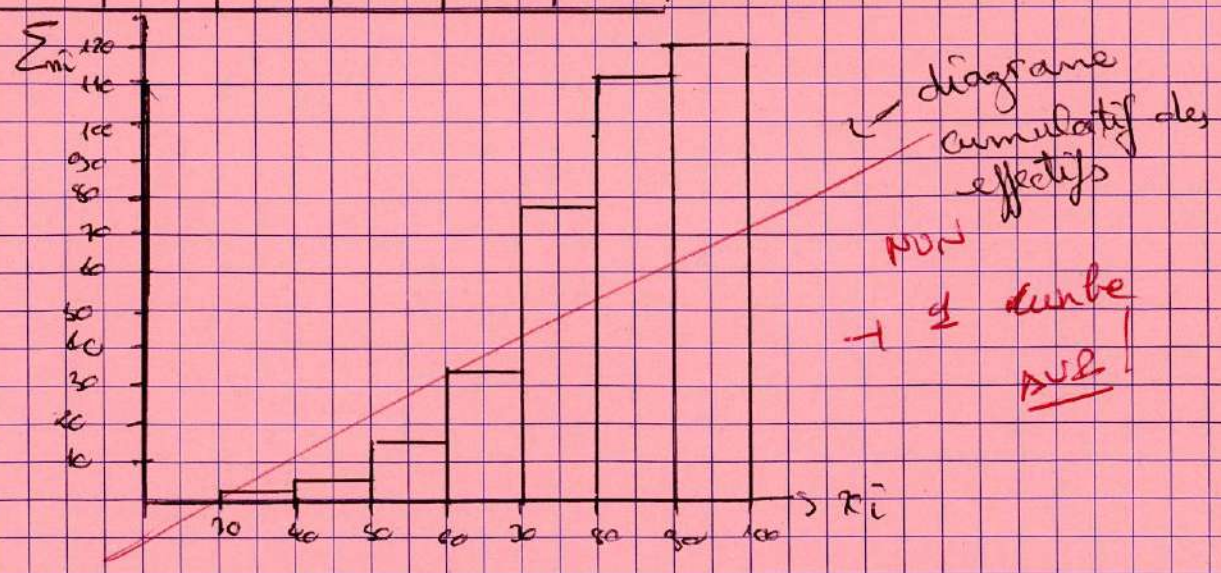
Partie II: statistiques

1) La population étudiée ce sont les étudiants de l'EFROI en LG. Le caractère observé est leur notes de probabilités sur 100, qui est un caractère quantitative continue.



effectif						
cumulé	1	4	15	36	79	120

100



pourquoi?

76,66

3) La mode c'est : $70-80/100$ ou on a ~~43~~ ^{NON} étudiants

4) A partir de la question 2, nous pouvons situer la médiane entre 70 et 80.

$$Me = l_2 + \left(\frac{n}{2} - F_1\right) \frac{l_2 - l_1}{F_2 - F_1} = 70 + (60 - 30) \frac{10}{79 - 30}$$

$$Me = 75,58$$

$$5) Q_1 = l_1' + \left(\frac{n}{4} - F_1'\right) \frac{l_2' - l_1'}{F_2' - F_1'} = 67,14$$

$$Q_3 = l_1'' + \left(\frac{3n}{4} - F_1''\right) \frac{l_2'' - l_1''}{F_2'' - F_1''} = 80 + (90 - 83)$$

$$Q_3 - Q_1 = 75,6 \neq Me = 76,66$$

6) Moyenne arithmétique $\bar{x} =$

$$\bar{x} = \sum_i f_i x_i = \frac{1}{n} \sum_i n_i x_i = \frac{1}{120} (1 \times 35 + 3 \times 45 + \dots + 9 \times 95)$$

$$\bar{x} = 76,125$$

7) L'écart type est : $\sqrt{\sigma^2}$

$$\sigma^2 = \frac{1}{120} (1 \times 35^2 + 3 \times 45^2 + \dots + 9 \times 95^2) = 5696,66$$

$$\sigma^2 = 5696,66 + (76,125)^2 = 564,10$$

$$\sigma = 23,75$$

3/70

Exercise 2:

1) $f_{i.} = \frac{n_{i.}}{n}$; $f_{.2} = 1/8 \Rightarrow n_{.2} = f_{.2} \times n$

$$n_{.2} = \frac{1}{8} \times 40 = 5$$

$f_{y/x} \Leftrightarrow f_{10/2} = 0,4$

$$f_{10/2} = \frac{n_{210}}{n_{.2}} = \frac{a}{5} = 0,4$$

$$a = 2 \Rightarrow a = \frac{2}{10} = 0,2$$

$a = 2 \Rightarrow b = 3$ valid

$y \backslash x$	10	20	30	40	
2	2	0	3	0	5 = $n_{.2}$
4	0	3	0	2	5 = $n_{.4}$
6	3	0	2	0	5 = $n_{.6}$
8	0	2	0	3	5 = $n_{.8}$
10	5	5	5	5	20 = $n_{.10}$
	$n_{.10} = 10$	10	10	10	<u>valid</u>

7/30

2) $f_{10.} = \frac{n_{10.}}{40} = \frac{20}{40} = \frac{1}{2}$ valid

3) $\bar{x} = \frac{1}{n} \sum n_{i.} x_i = \frac{1}{40} (5 \times 2 + 5 \times 4 + \dots) = 7,5$ valid

$$\bar{y} = \frac{1}{n} \sum n_{.j} y_j = 2,5$$
 valid

$$\overline{x^2} = 65$$

$$\text{Var}(x) = \overline{x^2} - \bar{x}^2 = 65 - 56,25 = 8,75$$

$$\text{Var}(y) = \overline{y^2} - \bar{y}^2 = 750 - 625 = 125$$
 valid

4) $\bar{x}_j = \sum x_i \times \frac{n_{ij}}{n_{.j}} \Rightarrow \bar{x}_1 = 7,8$ valid $\bar{y}_i = \sum y_j \times \frac{n_{ij}}{n_{i.}}$
 $\bar{x}_2 = \dots$ $\bar{y}_1 = 2,2$ valid

Partie I: Probabilités

Exo 1: v.a. - continue,

$$-\frac{1}{4} \leq X \leq \frac{3}{4}$$

1) $\int_{-1/4}^{3/4} f(x) dx = 1 \Rightarrow f(x) [x]_{-1/4}^{3/4} = 1$

$$f(x) = \frac{1}{\frac{3}{4} + \frac{1}{4}} = 1$$

2) $F(x) = \int_{-1/4}^{3/4} f(x) dx = [x]_{-1/4}^{3/4} = \frac{3}{4} - (-\frac{1}{4}) = 1$

3) $E(x) = \int_{-1/4}^{3/4} x f(x) dx = [\frac{x^2}{2}]_{-1/4}^{3/4} = 0,28125 - 0,03125 = 0,25 = \frac{1}{4}$

$$E(x^2) = \int_{-1/4}^{3/4} x^2 f(x) dx = [\frac{x^3}{3}]_{-1/4}^{3/4} = 0,1406 - (-\frac{1}{4})^3 = 0,4354$$

$$\text{Var}(X) = E(X^2) - E(X)^2 = 0,4354 - 0,0625 = 0,3729$$

Exo 2: 1) $f(x) = aX + b$

3/60

0/80