

# CORRIGÉ

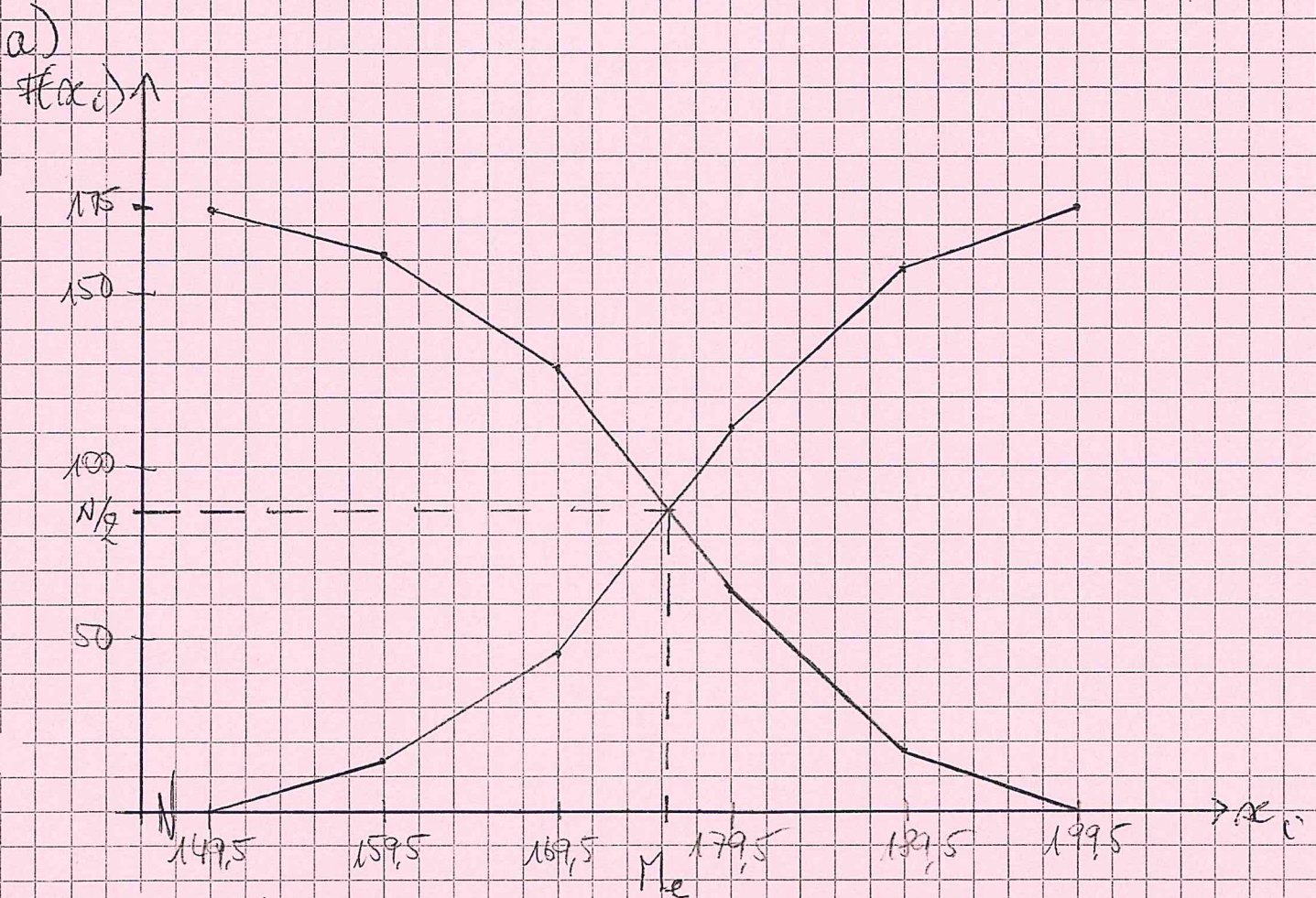
centres des cl.	nbre d'étudiants	eff. cum. cr.	eff. cum. décr.	$z_i$	$n_i z_i$	$n_i z_i^2$
154.5	14	14	175	-2	-28	56
164.5	32	46	161	-1	-32	32
174.5	65	111	129	0	0	0
184.5	47	158	64	1	47	47
194.5	17	175	17	2	34	68
Total	175				21	203

$$z_i = (x_i - 174.5) / 10$$

Moyenne 175.7

Variance 114.56

Ecart-type 10.70327053



$$b) \bar{z} = \frac{21}{175} = 0,12$$

$$\bar{x} = a \bar{z} + x_0 = 10 \cdot 0,12 + 174,5 = 175,7$$

$$\sigma_z^2 = \frac{203}{175} - (0,12)^2 = 1,1456$$

$$\sigma_x^2 = a^2 \cdot \sigma_z^2 = 100 \cdot 1,1456 = 114,56$$

$$\sigma_x = \sqrt{114,56} = 10,703$$

c)  $N/2 = 87,5 \rightarrow$  classe médiane:  $[169,5 - 179,5[$

$$Me = 169,5 + \frac{87,5 - 46}{65} \cdot 10 = 175,9$$



$$d) \bar{x} - \sigma = 164,997$$

$$\bar{x} + \sigma = 186,403$$

$$\text{Effectif} = \frac{169,5 - 164,997}{10} \cdot 32 + 65 + \frac{186,403 - 179,5}{10} \cdot 47$$
$$= 14,4 + 65 + 32,4 = 111,84$$

$$\text{Pourcentage} = \frac{111,84}{175} = 0,639, \text{ donc } 63,9\%$$

la série est moins concentrée (plus dispersée) que la distribution Normale pour pour le pb serait de 65%.

$$\textcircled{2} a) (1) A_{25}^3 = \frac{25!}{22!} = 13.800$$

$$(2) A_{25}^3 \cdot C_{22}^3 = 21.252.000$$

$$b) (1) P(E) = \frac{10}{22} \cdot \frac{9}{21} \cdot \frac{8}{20} = 0,0779$$

$$\text{ou bien } P(E) = \frac{C_{10}^3}{C_{22}^3} = 0,0779$$

$$(2) P(E) = \frac{C_{10}^1 \cdot C_{12}^2}{C_{22}^3} = 0,428$$

$$c) P(E) = \frac{10 \cdot 7 \cdot 5}{22 \cdot 21 \cdot 20} = 0,038$$

$$\textcircled{3} a) P(E) = 0,25 \cdot 0,03 + 0,35 \cdot 0,01 + 0,40 \cdot 0,04$$
$$= 0,027$$

$$b) E_1 = \{ \text{véh. defectueux} \}$$

$$E_2 = \{ \text{usine 1} \}$$

$$P(E_2/E_1) = \frac{P(E_2 \cap E_1)}{P(E_1)}$$

$$= \frac{0,25 \cdot 0,03}{0,027}$$

$$= 0,28$$



$$(4) X = \{0, 1, 2, 3, 4\}$$

$$a) P(X=0) = \frac{C_{12}^5}{C_{16}^5} = \frac{66}{364} = 0,1813$$

$$P(X=1) = \frac{C_{12}^4 \cdot C_4^1}{C_{16}^5} = \frac{165}{364} = 0,4533$$

$$P(X=2) = \frac{C_{12}^3 \cdot C_4^2}{C_{16}^5} = \frac{110}{364} = 0,3022$$

$$P(X=3) = \frac{C_{12}^2 \cdot C_4^3}{C_{16}^5} = \frac{22}{364} = 0,0604$$

$$P(X=4) = \frac{C_{12}^1 \cdot C_4^4}{C_{16}^5} = \frac{1}{364} = 0,0027$$

$x_i$	0	1	2	3	4
$p_i$	$\frac{66}{364}$	$\frac{165}{364}$	$\frac{110}{364}$	$\frac{22}{364}$	$\frac{1}{364}$

$$b) \text{ pour } x \leq 0, F(x) = P(X < 0) = 0$$

$$0 < x \leq 1, F(x) = P(X < 1) = 0,1813$$

$$1 < x \leq 2, F(x) = P(X < 2) = 0,6346$$

$$2 < x \leq 3, F(x) = P(X < 3) = 0,9368$$

$$3 < x \leq 4, F(x) = P(X < 4) = 0,9972$$

$$x > 4, F(x) = P(X \leq 4) = 0,9999 \approx 1$$

$$c) E(X) = \sum x_i \cdot p_i = 1,2497$$

$$\sigma^2(X) = \sum x_i^2 \cdot p_i - [E(X)]^2$$

$$= 0,6871$$

$$\sigma(x) = \sqrt{0,6871}$$

$$= 0,8289$$



