حل التمرين ١:

x_i	f_i	f_r	$f_r\%$	f_{cc}	f_{cd}	$x_i \cdot f_i$
8	2	0,1	10 %	2	18	16
9	4	0,2	20 %	6	14	36
10	6	0,3	30 %	12	8	60
11	4	0,2	20 %	16	4	44
12	3	0,15	15 %	19	1	36
13	1	0,05	5%	20	0	13
Σ	20	1	100%	/	/	205

20

$$f_r = \frac{f_i}{n}$$

$$f_1 = \frac{f_1}{n} = \frac{2}{20} = 0,1 \qquad \Sigma f_r = 1$$

$$f_2 = \frac{f_2}{n} = \frac{4}{20} = 0,2 \qquad \Sigma f_r = f_1 + f_2 + f_3 + f_4 + f_5 + f_6$$

$$0,1 + 0,2 + 0,3 + 0,2 + 0,15 + 0,05 =$$

$$f_3 = \frac{f_3}{n} = \frac{6}{20} = 0,3$$

$$f_4 = \frac{f_4}{n} = \frac{4}{20} = 0,2$$

22

$$f_5 = \frac{f_5}{n} = \frac{3}{20} = 0,15$$

$$f_6 = \frac{f_6}{n} = \frac{1}{20} = 0,05$$

$$\sigma^2 = \frac{f_1(c_1-\bar{x})^2 + f_2(c_2-\bar{x})^2 + f_3(c_3-\bar{x})^2 + f_4(c_4-\bar{x})^2 + f_5(c_5-\bar{x})^2 + f_6(c_6-\bar{x})^2 + f_7(c_7-\bar{x})^2}{n}$$

$$\sigma^2 = \frac{2(24-35)^2 + 5(28-35)^2 + 14(32-35)^2 + 12(36-35)^2 + 9(40-35)^2 + 5(44-35)^2 + 3(48-35)^2}{50}$$

$$\sigma^2 = \frac{242 + 245 + 126 + 12 + 228 + 405 + 507}{50}$$

$$\sigma^2 = \frac{1762}{50} = \boxed{35.24}$$

σ^2 ... σ ... $\sigma = \sqrt{\sigma^2}$

$$\sigma = \sqrt{35.24} = \boxed{5.9363}$$

$fcd^{+}_{(i-1)} : fcd_1 - f_i$ حساب fcd^{+}

$fcd_1 = fcd_0 - f_1 = 20 - 2 = 18$

$fcd_2 = fcd_1 - f_2 = 18 - 4 = 14$

$fcd_3 = fcd_2 - f_3 = 14 - 6 = 8$

$fcd_4 = fcd_3 - f_4 = 8 - 4 = 4$

$fcd_5 = fcd_4 - f_5 = 4 - 3 = 1$

$fcd_6 = fcd_5 - f_6 = 1 - 1 = 0$

(18)

حساب الحتوسط الحسابي

$$\bar{X} = \frac{\sum X_i \cdot f_i}{n}$$

$$\bar{X} = \frac{(X_1 \times f_1) + (X_2 \times f_2) + (X_3 \times f_3) + (X_4 \times f_4) + (X_5 \times f_5) + (X_6 \times f_6)}{n}$$

$$\bar{X} = \frac{(8 \times 2) + (9 \times 4) + (10 \times 6) + (11 \times 4) + (12 \times 3) + (13 \times 1)}{20}$$

$$\bar{X} = \frac{16 + 36 + 60 + 44 + 36 + 13}{20}$$

$$\bar{X} = \frac{205}{20} = 10,25 \simeq 10$$

(6)

حل التمرين الثاني:

$n = 50$ $\quad Log\,50 = 1,6989$

حساب عدد الفئات K

$K = 1 + 3,332 \, Log\, n$

$K = 1 + (3,332) \times (1,6989)$

$K = 1 + 5,6607$

$K = 6,6607 \simeq 7$

حساب طول الفئة

$$\Delta = \frac{X_{max} - X_{min}}{K}$$

$$\Delta = \frac{51 - 22}{6,6607} = \frac{29}{6,6607} = 4,3538 \simeq 4$$