Q1. 16 employees - Find mean Salary

Q1

x	f	fx	cf
~~18000~~	~~2~~		
17000	2	34000	2
18000	2	36000	4
19000	4	76000	8 ← Mode Salary (Most Frequent)
19500	2	39000	10 ← cf. Median x
20000	1	20000	11
21000	1	21000	12
22000	1	22000	13
46500	1	46500	14
~~72000~~			
48000	1	48000	15
72000	1	72000	16
	$\Sigma f = 16$	414500	$\Sigma cf = 16$

303,000

(a) Mean $\bar{x} = \frac{\Sigma fx}{\Sigma f}$ $\frac{414500}{16}$ = 25,906.25

(b) Find Median = find cf = 16 (even) = $\frac{16}{2} + 1$ = 9th place → 4th class = 19500

(c) Find Mode = 19000 (Most frequent)

(d) Find Interquartile range. $n = \frac{16}{4}$ (employees) = 4 m = 4th. from lower & upper quartile.

Q_1 Lower quartile = 19500

Q_3 Upper quartile = 22000

$Q_3 - Q_1$ = 2500

Q2

10 - 14	26	12	312
15 - 19	43274	17	743458
20 - 24	11710	22	257620
25 - 29	15793	27	426411
30 - 34	17583	32	562656
35 - 39	11089	37	410293
40 - 44	2979	42	104118
45 - 50	129	47.5 ~ 48	6127.5
	Σf: 63183		Σfm 1841895.5

or x_m = add class limits / 2 (mid point)

$fm = f * m$

(a) Find mean, grouped frequency

$$\bar{x} = \frac{\Sigma fm}{\Sigma f} = \frac{1841895.5}{63183}$$

mean = 29.1517 ~ 29

(b) Standard deviation grouped frequency

$$s\sqrt{\frac{\Sigma(x-\bar{x})^2}{n}}$$

$(x-\bar{x})^2 \times f$

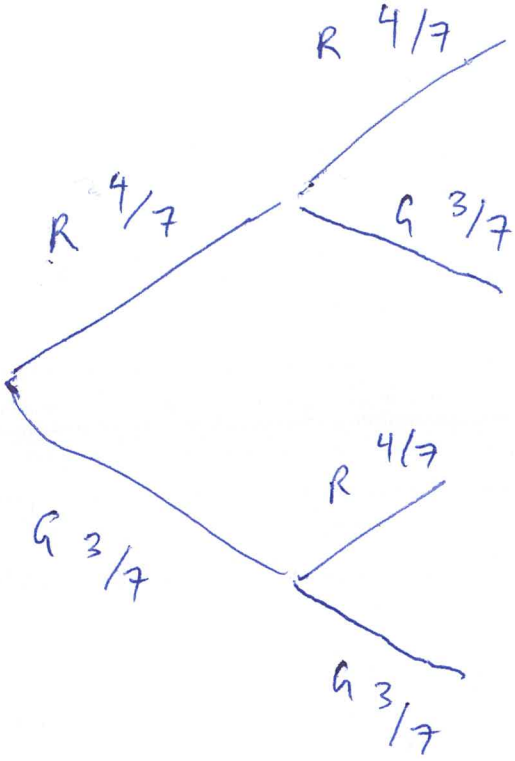
n	$x - \bar{x}$	$(x-\bar{x})^2$	$f(x-\bar{x})^2$
12	-17	289	3468 7514
17	-12	144	629856
22	-7	49	573790
27	-2	4	70332
32	3	9	158247
37	8	64	709696
42	13	169	418951
47.5 ~ 48	19	361	46569
		Σxf	2614955

$$s\sqrt{\frac{2614955}{63183}} = s\sqrt{41.3870028}$$

$s = 6.43327$

Q3 Bag = 7 balls 4 red balls 3 green balls

(a)



$P(RR)\ \frac{4}{7} \times \frac{4}{7}\ \frac{16}{49} = 0.32 = 32\%$

$P(RG)\ \frac{4}{7} \times \frac{3}{7}\ \frac{12}{49} = 0.244 = 24\%$

$P(GR)\ \frac{3}{7} \times \frac{4}{7}\ \frac{12}{49} = 0.244 = 24\%$

$P(GG)\ \frac{3}{7} \times \frac{3}{7}\ \frac{9}{49} = 0.183 = 18\%$

(b) both balls same colour.

$P(RR) + P(GG) = \frac{16}{49} + \frac{9}{49} = \frac{25}{49} = 0.51 = 51\%$

(c) One ball is green.

$P(RG) + P(GR) + P(GG)\ \frac{12}{49} + \frac{12}{49} + \frac{9}{49} = \frac{33}{49} = 0.673 = 67\%$

(d) Balls different colours

$P(RG) + P(GR) = \frac{12}{49} + \frac{12}{49} = \frac{24}{49} = 0.489 = 49\%$

Q4. Papers sold

	f	cf
18	2	2
19	0	2
20	4	6
21	0	6
22	2	8
23	1	9
24	0	9
25	1	10
	$\Sigma f = 10$	

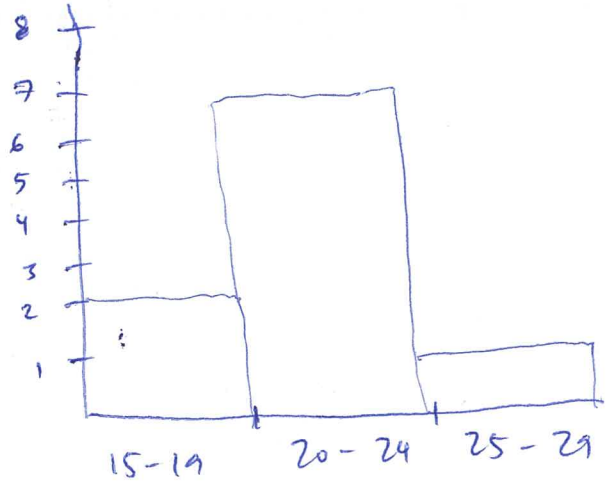
(a) frequency distribution

(b) Cumulative frequency

(c) Grouped frequency

15 - 19	2
20 - 24	7
25 - 29	1

(d) Histogram



Q5. 89 students

Mean $\bar{x} = \frac{\Sigma fm}{\Sigma f}$

cf

m = add. class limits /2

Class interval	f	m	m	fm	cf
40-49	7	~~44.5~~	45	315	7
50-59	18	~~54.5~~	55	990	25
60-69	14	~~64.5~~	65	910	39
70-79	23	~~74.5~~	75	1725	62
80-89	13	~~84.5~~	85	1105	75
90-100	14	~~95~~	95	1330	89
	n 89		Σfm	6375	

4th class

$\bar{x} = \frac{6375}{89}$

(a) Mean $= 71.629 \sim 72\% =$ this is the mean because you can see it is the middle and part of the higher frequency class. (25)

Q5 (b) Calculate Median & Mode.

mean = 72.

$$\text{Median} = L_m + \left(\frac{\frac{n}{2} - F}{f_m}\right) i$$

cf = 89 = odd number so; $\frac{89+1}{2} = 45^{th}$ place.

on cf table it is 4th class 70-79 / 23

$$\text{median} = 69.5 + \left(\frac{\frac{89}{2} - 39}{23}\right) 10$$ ← class width.

$$44.5 - 39 = \frac{5.5}{23} = 0.239 \times 10 = 2.39$$

$69.5 + 2.39$

$= 71.89$ is the median

$$\text{Mode} = L_{mo} + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2}\right) i$$

Find highest frequency, = $69.5 + \left(\frac{(23-14)}{(23-14)+(25-13)}\right) 10$

$$= \frac{9}{9+10} = \frac{9}{19} = 0.473 = 4.73$$

$69.5 + 4.73$

$= 74.236$ - is the mode.