9	x	f	fx	$(x-\bar{x})$	$f(x-\bar{x})$
	300,000	2	600,000	-925000	1.711×10^{12}
	500 000	3	1,500,000	-725000	1.577×10^{12}
	750 000	8	6000000	-475000	1.805×10^{12}
	900 000	6	5400,000	-325000	6.63×10^{11}
	1000 000	2	2000000	-225000	1.0125×10^{11}
	1500 000	1	1500,000	275000	7.5×10^{10}
	3000 000	1	3000000	1775000	3.15×10^{12}
	4000 000	1	4000000	2775000	7.7×10^{12}
		24	29400000		1.554×10^{13}

(a)

$$\frac{\Sigma fx}{24} = \frac{29400000}{24}$$

1,225,000

Interquartile range

$$Q_1 = \frac{1}{4} \times 25 = \frac{25}{4} = 6.25$$

= 750,000

$$Q_3 = 6.25 \times 3 = 18.75$$

900,000

$Q_3 - Q_1$ = 900,000 - 750,000

150,000

Semi quartile range

$$\frac{150000}{2} = 7500$$

c

(8)

(a) The standard deviation will be abit smaller and hence, left hand whisker will be shorter

(b) $\frac{12+160+245+304}{21} = \frac{721}{21}$

34.4

The new mean is 3.4

(c) This is due to the removal of outliners

b Chi-Yan have better control over her drives & a lower standard deviation in their distances. If their putting abilities are essentialy equal, Then Chi-Yan will more likely to have a better score in a round of golf.

Variance.

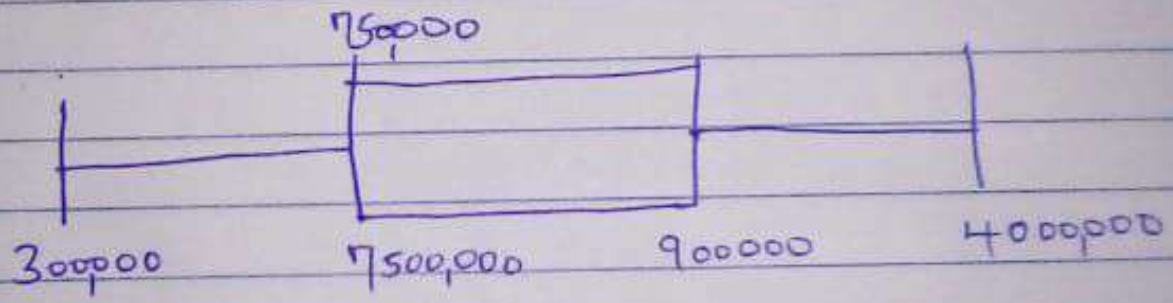
$$s^2 = \frac{1.554 \times 10^{13}}{24} = 6.475 \times 10^{11}$$

Standard deviation.

$$\sqrt{6.475 \times 10^{11}}$$

$$= 804\,673.4$$

b



(c) $$Z \text{ score} = \frac{300{,}000 - 1225000}{804\,673.4}$$

$$-0.87$$

(d) After calculating the new average salary and standard deviation, the Z-score will be -0.037.

$\frac{18-20}{4.06} = \frac{-2}{4.06} = -0.49$

$\frac{15-20}{4.06} = \frac{-5}{4.06} = -1.23$

$\frac{26-20}{4.06} = \frac{6}{4.06} = 1.48$

$\frac{20-20}{4.06} = \frac{0}{4.06} = 0$

$\frac{21-20}{4.06} = \frac{1}{4.06} = 0.25$

6. mean

44+18+125+80+63+42+35+68+52+75+260+96+110+72+51

$\frac{1191}{15} = 79.5$

44 - 79.5 = -35.5 = 1260.25
18 - 79.5 = -61.5 = 3782.25
125 - 79.5 = 46.5 = 2162.25
80 - 79.5 = 0.5 = 0.25
63 - 79.5 = 16.5 = 272.25
42 - 79.5 = -37.5 = 1406.25
35 - 79.5 = -44.5 = 1980.25
68 - 79.5 = -11.5 = 132.25
52 - 79.5 = -29.5 = 756.25
75 - 79.5 = -45 = 20.25
260 - 79.5 = 180.5 = 32580.25
96 - 79.5 = 16.5 = 272.25
110 - 79.5 = 30.5 = 930.25
72 - 79.5 = 7.5 = 56.25
51 - 79.5 = 28.5 = 812.25

Total 46304.75

$$s^2 = \frac{46,304.25}{15-1} = 3309.45$$

standard deviation

$$\sqrt{3307.45}$$

$$= 57.51$$

(b) Median

18, 35, 42, 44, 51, 52, 63, 72, 75, 80, 96, 110, 125, 260

$$\frac{1}{2} \times 15+1 = \frac{1}{2} \times 16 = 8th$$

$$= 68$$

Interquartile range.

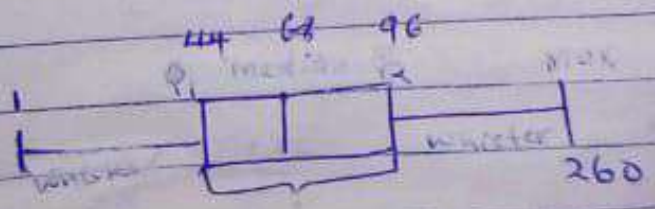
$$Q_1 = \frac{1}{4} \times 16 = 4$$

$$Q_3 = \frac{3}{4} \times 16 = 12th = 96$$

$$96 - 44 = 52$$

Semi quartile $\frac{52}{2} = 26$

(c)



(d) 260

Variance

$$\sigma^2 = \frac{945.91}{9}$$

$$= 105.35$$

Standard deviation

$$\sqrt{105.35}$$

$$= 10.41$$

(a)

(a) 3, 4, 5, 6, 6, 8, 9, 11, 15

median = 6

$$Q_1 = \frac{1}{4} \times 10 = 2.5$$

between 2nd and 3rd

$$\frac{4+5}{2} = 4.5$$

$$Q_3 = \frac{3}{4} \times 10 = 7.5$$

between 7th and 8th

$$\frac{9+11}{2} = 10$$

Interquartile range

$$10 - 4.5$$

$$= 5.5$$

(3)

43 48 56 59 62 64 72, 75, 75, 78, 81, 84, 88, 90

Median = $\frac{1}{2} + 17 = 8.5$

$$\frac{71+72}{2} = 71.5$$

7(a) mean

x	f	cf	fx	x − x̄	f(x − x̄)²
12	1	1	12	−23.8	566.44
32	5	6	160	−3.8	72.2
35	7	13	245	−0.8	4.48
38	8	21	304	2.2	38.72
42	5	26	210	6.2	192.2
	26		931		874.04

mean

$$\frac{\Sigma fx}{\Sigma f} = \frac{931}{26}$$

$$35.8$$

$$\text{Variance} = \frac{874.04}{26}$$

$$33.6$$

$$\text{Standard deviation} = \sqrt{33.6}$$

$$= 5.8$$

(b) median

$$\frac{26+1}{2} = 13.5 = 13\text{th and } 14\text{th}$$

$$\frac{38+35}{2} = \frac{73}{2} = 36.5$$

Interquartile

$$Q_1 = \frac{13.5}{2} = 6.75 = 6\text{th and } 7\text{th}$$

$$\frac{32+35}{2} = 33.5$$

$$Q_2 = 6.75 \times 3 = 20.25 = \frac{38+35}{2} = \frac{73}{2} = 36.5$$

$$36.5 - 33.5$$

$$3$$

Semiquartile

$$\frac{3}{2}$$

$$= 1.5$$

$Q1 = \frac{59+62}{2} = 60.5$

$Q3 = \frac{78+81}{2} = 79.5$

Interquartile range

$79.5 - 60.5$

$= 19$

(3)

(a) Fast quartile

(b) Second quartile

(c) Second quartile.

4.

(a) 25th or 25%.

(b) 50th or 50%

(c) 75th or 75%

5)

$18+15+26+20+21$

$= \frac{100}{5} = 20$

$S = \sqrt{\frac{66}{5-1}}$

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

$18-20 = -2 = 4$

$15-20 = -5 = 25$

$26-20 = 6 = 36$

$20-20 = 0 = 0$

$21-20 = 1 \quad 1$

66

$= 4.06$

90

2.6

1.a

Mean

5+7+9+6+5+10+8+12+11+8+7+7+6+9+5+8

$\frac{\Sigma x}{N} \quad \frac{113}{16} = 7.0625$

Standard deviation: Variance.

$S = \sqrt{\frac{\Sigma(x-\mu)^2}{N}}$

$5 - 7.1 = -2.1$	$(-2.1 \times 3) = -6.3$	$(-6.3)^2 = 39.69$
$7 - 7.1 = (-0.1 \times 3)$	$= (0.9)^2$	$= 0.81$
$9 - 7.1 = (1.9 \times 2)$	$= 3.8$	$= 14.44$
$6 - 7.1 = (-1.1 \times 2)$	$= -2.2$	$= 4.84$
$10 - 7.1 = (2.9 \times 1)$	$= 2.9$	$= 8.41$
$8 - 7.1 = (0.9 \times 3)$	$= 2.7$	$= 7.29$
$2 - 7.1 = (-5.1 \times 1)$	$= -5.1$	$= 26.01$
$11 - 7.1 = (3.9 \times 1)$	$= 3.9$	$= 15.21$
	Total	160.26

$\sigma^2 = \frac{160.26}{16} \quad \frac{10.02}{2}$

$= 5.0$

Standard deviation

$S = \sqrt{5}$

$= 2.2$

(b) mean. $12.55 + 15.31 + 21.98 + 45.35 + 19.81 + 33.89 + 29.53 + 30.19 + 38.20$

$\frac{246.81}{9} = 27.42$

$12.55 - 27.42 = (-14.87)$	$= 221.12$	$33.81 - 27.42 = (6.39)^2 = 40.83$
$15.31 - 27.42 = (-12.11)$	$= 146.65$	$29.53 - 27.42 = (2.11)^2 = 4.45$
$21.98 - 27.42 = (-5.44)$	$= 29.59$	$30.19 - 27.42 = (2.77)^2 = 9.67$
$45.35 - 27.42 = (17.93)$	$= 321.48$	$38.20 - 27.42 = (10.78)^2 = 116.2$
$19.81 - 27.42 = (-7.61)$	$= 57.91$	Total. 945.91