Penyelesaian Lengkap

PRAKTIS 8

Kertas 1

1 Beza/*Difference* = (182 – 149) cm
$\qquad\qquad\quad$ = 33 cm

Jawapan/*Answer*: **A**

2 Serakan *P*/*Dispersion of P* = 75 – 37
$\qquad\qquad\qquad\qquad\qquad$ = 38
$\quad$ Serakan *Q*/*Dispersion of Q* = 78 – 32
$\qquad\qquad\qquad\qquad\qquad$ = 46
$\quad$ Serakan *R*/*Dispersion of R* = 70 – 35
$\qquad\qquad\qquad\qquad\qquad$ = 35
$\quad$ Susunan data/*Arrangement of data* = *R*, *P*, *Q*

Jawapan/*Answer*: **C**

3 Beza/*Difference* = (42 – 31) kg
$\qquad\qquad\quad$ = 11 kg

Jawapan/*Answer*: **B**

4 Nilai terkecil/*The smallest value* = 44; Nilai terbesar/*The largest value* = 62
$\quad$ Julat/*Range* = 62 – 44
$\qquad\qquad\quad$ = 18

Jawapan/*Answer*: **A**

5 Susun semula data/*Rearrange the data*:

Separuh data sebelum median	Separuh data selepas median
Half of the data before median	*Half of the data after median*

16.1 $\quad$ 19.9 $\quad$ 22.4 $\quad$ 22.7 $\quad$ 24.6 $\quad$ 25.7 $\quad$ 26.4

$\qquad\qquad \uparrow \qquad\qquad\qquad \uparrow \qquad\qquad\qquad \uparrow$
$\qquad\qquad Q_1 \qquad\qquad$ Median $\qquad\qquad Q_3$

$Q_3 - Q_1$ = 25.7 – 19.9
$\qquad\quad$ = 5.8

Jawapan/*Answer*: **C**

6

Jumlah masa tidur (jam) *Total sleeping time* (*hours*)	3	4	5	6	7	8
Kekerapan *Frequency*	4	5	8	10	6	2
Kekerapan longgokan *Cumulative frequency*	4	9	17	27	33	35
	$C_1 - C_4$	$C_5 - C_9$	$C_{10} - C_{17}$	$C_{18} - C_{27}$	$C_{28} - C_{33}$	$C_{34} - C_{35}$

Q_1 = cerapan ke-$\left(\dfrac{1}{4} \times 35\right)$ $\qquad\qquad Q_3$ = cerapan ke-$\left(\dfrac{3}{4} \times 35\right)$

$\quad$ = cerapan ke-8.75 = 4 $\qquad\qquad\quad$ = cerapan ke-26.25

$Q_3 - Q_1$ = 6 – 4 $\qquad\qquad\qquad\qquad\qquad$ = 6

$\qquad\quad$ = 2

Jawapan/*Answer*: **C**

7 $\sigma^2 = \dfrac{\sum x^2}{N} - (\bar{x})^2$

$\quad = \dfrac{4^2 + 6^2 + 7^2 + 8^2 + 9^2 + 11^2}{6} - \left(\dfrac{4 + 6 + 7 + 8 + 9 + 11}{6}\right)^2$

$\quad = 4.917$

Jawapan/*Answer*: **B**

8 Min/*Mean*, $\bar{x} = \dfrac{3(5) + 5(6) + 7(7) + 6(8) + 5(9) + 4(10)}{3 + 5 + 7 + 6 + 5 + 4}$

$\qquad\qquad\quad = 7.567$

$\sigma^2 = \dfrac{\sum fx^2}{\sum f} - (\bar{x})^2$

$\quad = \dfrac{3(5^2) + 5(6^2) + 7(7^2) + 6(8^2) + 5(9^2) + 4(10^2)}{30} - (7.567)^2$

$\quad = 2.307$

Jawapan/*Answer*: **C**

9 $\sigma = \sqrt{\dfrac{11^2 + 11^2 + 13^2 + 14^2 + 15^2 + 16^2 + 18^2 + 19^2 + 20^2}{9} - \left(\dfrac{11 + 11 + 13 + 14 + 15 + 16 + 18 + 19 + 20}{9}\right)^2}$

$\quad = 3.12$

Jawapan/*Answer*: **D**

10 **A** Julat/*Range* $= 30 - 5$ Julat antara kuartil/*Interquartile range* $= 20 - 10$
$\qquad\qquad\qquad\quad = 25 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 10$

    B Julat/*Range* $= 60 - 10$ Julat antara kuartil/*Interquartile range* $= 38 - 18$
$\qquad\qquad\qquad\quad = 50 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 20$

    C Julat/*Range* $= 90 - 25$ Julat antara kuartil/*Interquartile range* $= 78 - 68$
$\qquad\qquad\qquad\quad = 65 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 10$

    D Julat/*Range* $= 70 - 45$ Julat antara kuartil/*Interquartile range* $= 64 - 53$
$\qquad\qquad\qquad\quad = 25 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad = 11$

Jawapan/*Answer*: **A**

11 $v = \dfrac{u}{5} + 3$ di mana/*where* $u = $ data asal/*original data*

$\qquad\qquad\qquad\qquad v = $ data baharu/*new data*

Varians/*Variance* $= \dfrac{\sigma^2}{25}$ (penambahan tidak memberi kesan kepada sukatan serakan)
$\qquad\qquad\qquad\qquad\quad$ (*Addition has no effect on the measures of dispersion*)

Jawapan/*Answer*: **C**

Kertas 2

Bahagian A

1 (a)
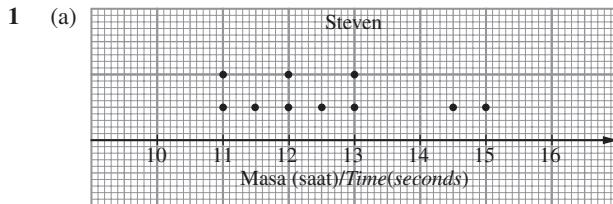
    (b) Akil:

Min/*Mean*, $\bar{x} = \dfrac{11 + 2(12) + 3(12.5) + 2(13) + 14 + 14.5}{10}$

$\qquad\qquad\quad = 12.7$

Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{11^2 + 2(12^2) + 3(12.5^2) + 2(13^2) + 14^2 + 14.5^2}{10} - (12.7)^2}$

$\qquad\qquad\qquad\qquad\qquad\qquad\quad = 0.9539$

Steven:

Min/*Mean*, $\bar{x} = \dfrac{2(11) + 11.5 + 2(12) + 12.5 + 2(13) + 14.5 + 15}{10}$

$\qquad = 12.55$

Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{2(11^2) + 11.5^2 + 2(12^2) + 12.5^2 + 2(13^2) + 14.5^2 + 15^2}{10} - (12.55)^2}$

$\qquad = 1.293$

Akil. Nilai sisihan piawai yang lebih kecil menunjukkan prestasinya lebih konsisten.
*Akil. The smaller value of the standard deviation shows that his performance is more consistent.*

2 12, 13, <u>15</u>, 21, 23 | 24, 27, <u>32</u>, 36, 38
$\qquad\quad Q_1 \qquad M \qquad\quad Q_3$

Nilai minimum/*Minimum value* = 12 $\qquad\qquad$ Nilai maksimum/*Maximum value* = 38

Median $= \dfrac{23 + 24}{2}$ $\qquad\qquad Q_1 = 15 \qquad\quad Q_3 = 32$

$\qquad\quad = 23.5$
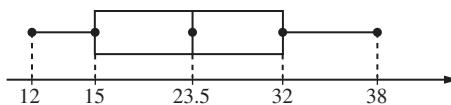
3	**Kehadiran/*Attendance***	25	26	27	28	29	30
	Gundalan/*Tally*	//	////	＃＃＃	＃＃＃	＃＃＃ ///	＃＃＃ /
	Kekerapan/*Frequency*	2	4	5	5	8	6
	Kekerapan longgokan ***Cumulative frequency***	2	6	11	16	24	30

Minimum/*Minimum* = 25 $\qquad\qquad$ Maksimum/*Maximum* = 30

Median = data ke-$\dfrac{30}{2}$ / $\left(\dfrac{30}{2}\right)^{\text{-th}}$ *data*

$\qquad\quad$ = data ke-15/15th *data*
$\qquad\quad$ = 28

Kuartil pertama/*First quartile* = data ke-$\dfrac{30}{4}$ / $\left(\dfrac{30}{4}\right)^{\text{-th}}$ *data*

$\qquad\qquad\qquad$ = data ke-7.5/7.5th *data*
$\qquad\qquad\qquad$ = 27

Kuartil ketiga/*Third quartile* = data ke-$\dfrac{3(30)}{4}$ / $\left(\dfrac{3(30)}{4}\right)^{\text{-th}}$ *data*

$\qquad\qquad\qquad$ = data ke-22.5/22.5th *data*
$\qquad\qquad\qquad$ = 29
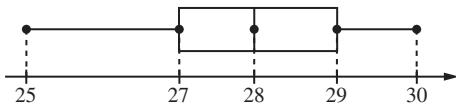
4 (a)   15,   <u>17</u>,   21,   ⟨23⟩,   24,   <u>27</u>,   30
$\qquad\qquad\quad Q_1 \qquad\qquad M \qquad\qquad Q_3$

$\qquad Q_3 - Q_1 = 27 - 17$
$\qquad\qquad\quad = 10$

(b) Min/*Mean*, $\bar{x} = \dfrac{15 + 17 + 21 + 23 + 24 + 27 + 30}{7}$

$\qquad\qquad\qquad = 22.43$

$$\text{Sisihan piawai/}Standard\ deviation,\ \sigma = \sqrt{\frac{15^2 + 17^2 + 21^2 + 23^2 + 24^2 + 27^2 + 30^2}{7} - (22.43)^2}$$

$$= 4.888$$

5 Data asal/*Original data*, *u*: $\sum x = 524$, $\sum x^2 = 45\ 956$

Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{45\ 956}{6} - \left(\dfrac{524}{6}\right)^2}$

$$= 5.676$$

Data baharu/*New data*, $v = \dfrac{\text{Data asal/}Original\ data,\ u - 3}{4}$

Sisihan piawai bagi *v*/*Standard deviation of v* $= \dfrac{\text{Sisihan piawai/}Standard\ deviation,\ u}{4}$

$$= \frac{5.676}{4}$$

$$= 1.419$$

Bahagian B

6 (a) Min/*Mean*, $\overline{x}$

$$= \frac{(2x - 1) + (x + 3) + 3x + 6 + (4x - 1) + (3x + 2) + (4x + 1) + 5x + (6x - 1) + 11}{10}$$

$$= \frac{28x + 20}{10}$$

$$= 2.8x + 2$$

(b) $2.8x + 2 = 7.6$

$2.8x = 5.6$

$x = 2$

Data: 3, 5, 6, 6, 7, 8, 9, 10, 11, 11

Varians/*Variance*, $\sigma^2 = \dfrac{3^2 + 5^2 + 6^2 + 6^2 + 7^2 + 8^2 + 9^2 + 10^2 + 11^2 + 11^2}{10} - (7.6)^2$

$$= 6.44$$

Sisihan piawai/*Standard deviation*, $\sigma = 2.538$

(c) Set data baharu/*New data set*, $v = 4 \times$ (data asal/*original data*, *u*) + 5

Varians/*Variance v* $= 4^2 \times$ Varians asal/*Original variance*, *u*

$$= 16 \times 6.44$$

$$= 103.04$$

7 (a) (i) $4 + 6 + p + q + 3 = 30$

$p + q = 30 - 13$

$p + q = 17$

$p = 17 - q$ …(1)

$$\frac{4(60) + 6(70) + 80p + 90q + 3(100)}{30} = 79\frac{2}{3}$$

$960 + 80p + 90q = 2\ 390$

$80p + 90q = 1\ 430$

$8p + 9q = 143$ …(2)

Gantikan (1) ke dalam (2)/*Substitute* (1) *into* (2):

$8(17 - q) + 9q = 143$

$136 - 8q + 9q = 143$

$q = 7$

Daripada/*From* (1): $p = 17 - 7$

$= 10$

(ii) Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{4(60^2) + 6(70^2) + 10(80^2) + 7(90^2) + 3(100^2)}{30} - \left(79\frac{2}{3}\right)^2}$

$$= 11.69$$

(b) Sisihan piawai kelas 4 Amanah/*Standard deviation of class* 4 Amanah $= \sqrt{\dfrac{225\,000}{35} - \left(79\dfrac{2}{3}\right)^2}$

$$= 9.044$$

Kelas 4 Amanah menunjukkan prestasi yang lebih baik kerana nilai sisihan piawainya lebih kecil daripada kelas 4 Bestari. Prestasi kelas 4 Amanah lebih konsisten.
Class 4 *Amanah shows better performance because its standard deviation is smaller than that of class* 4 *Bestari. This means the performance of class* 4 *Amanah is more consistent.*

Bahagian C

8 (a) **Rahman:**

Min/*Mean*, $\overline{x} = \dfrac{75 + 89 + 83 + 59 + 77 + 83 + 87 + 96 + 56 + 74}{10}$

$= 77.9$

Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{75^2 + 89^2 + 83^2 + 59^2 + 77^2 + 83^2 + 87^2 + 96^2 + 56^2 + 74^2}{10} - (77.9)^2}$

$= 12.03$

Tina:

Min/*Mean*, $\overline{x} = \dfrac{86 + 79 + 90 + 79 + 83 + 93 + 89 + 90 + 65 + 79}{10}$

$= 83.3$

Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{86^2 + 79^2 + 90^2 + 79^2 + 83^2 + 93^2 + 89^2 + 90^2 + 65^2 + 79^2}{10} - (83.3)^2}$

$= 7.836$

Mei Ling:

Min/*Mean*, $\overline{x} = \dfrac{85 + 87 + 74 + 67 + 73 + 79 + 84 + 86 + 76 + 68}{10}$

$= 77.9$

Sisihan piawai/*Standard deviation*, $\sigma = \sqrt{\dfrac{85^2 + 87^2 + 74^2 + 67^2 + 73^2 + 79^2 + 84^2 + 86^2 + 76^2 + 68^2}{10} - (77.9)^2}$

$= 7.049$

(b) Tina mempunyai pencapaian akademik yang terbaik. Min markahnya paling tinggi.
Tina's academic achievement is the best. Her mean marks is the highest.

(c) Tidak. Antara mereka bertiga, pencapaian akademik Mei Ling adalah yang paling konsisten. Sisihan piawai markah Mei Ling adalah yang paling kecil, iaitu 7.049. Semakin kecil nilai sisihan piawai, semakin konsisten pencapaian akademik.
No. Among the three of them, Mei Ling's academic achievement is the most consistent. The standard deviation of Mei Ling's marks is the smallest, that is 7.049. *The smaller the value of standard deviation, the more consistent is the academic achievement.*

(d) Rahman:

| 56	59	(74)	75	77		83	83	(87)	89	96
		↑			↑			↑		
		Q_1			M			Q_3		

$M = \dfrac{77 + 83}{2}$

$= 80$

Tina:

| 65 | 79 | (79) | 79 | 83 | | 86 | 89 | (90) | 90 | 93 |

$$Q_1 \qquad\qquad M \qquad\qquad Q_3$$

$$M = \frac{83 + 86}{2}$$
$$= 84.5$$

Mei Ling:

| 67 | 68 | (73) | 74 | 76 | | 79 | 84 | (85) | 86 | 87 |

$$Q_1 \qquad\qquad M \qquad\qquad Q_3$$

$$M = \frac{76 + 79}{2}$$
$$= 77.5$$
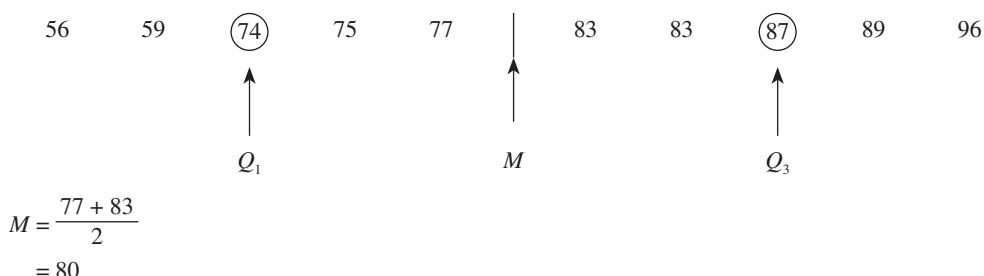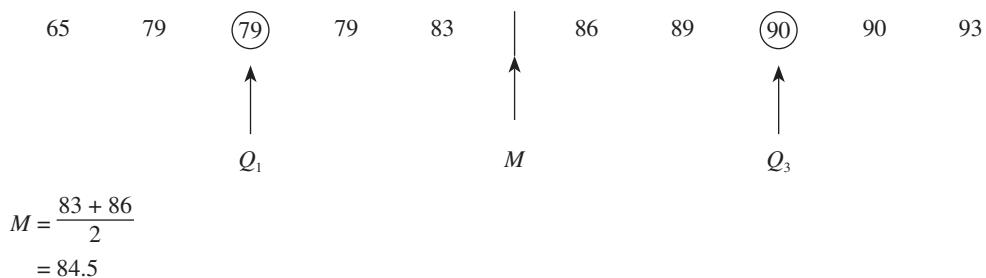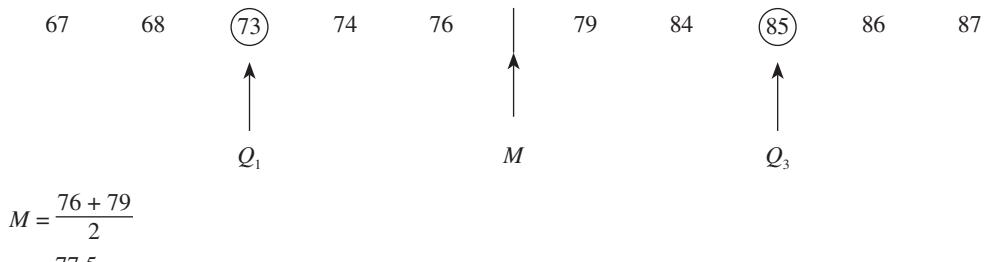
Pencapaian Akademik Murid/*Academic Achievement of Students*