

Rachel

$$\frac{41}{44} = 93\%$$

Terrific work, Rachel! Test a few to check.
Well done! Regards, Kris

①

1mm Squares

Section A: Analysing Data

Q1

12 13 14 14 14 15 16 18 18 19 23 40

a)

$$i) 12 + 13 + 14 + 14 + 14 + 15 + 16 + 18 + 18 + 19 + 23 + 40$$

$$= \frac{216}{12} = 18$$

ii) 14

$$iii) \frac{15 + 16}{2}$$

$$= \frac{31}{2} = 15.5$$

$$b) 12 + 13 + 14 + 14 + 14 + 15 + 16 + 18 + 18 + 19 + 23$$

$$= \frac{176}{11} = 16$$

Removing the outlier of 40 decreases the mean by 2.

good!

Q2)

a) Mean ✓

b) Median ✓

c) Mode ✓

Q3) 1 2^{Q1} 4 4 5^{Q2} 7 9^{Q3} 11 40

a)

i) $40 - 1 = 39$ ✓

ii) $Q_2 (\text{median}) = 5$ ✓

$$Q_1 = \frac{2+4}{2}$$

$$= \frac{6}{2}$$
 ✓

$$= 3$$

$$Q_3 = \frac{9+11}{2}$$

$$= \frac{20}{2}$$
 ✓

$$= 10$$

$$IQR = Q_3 - Q_1$$

$$= 10 - 3$$
 ✓

$$= 7$$

Q3) (continued)

b) The interquartile range is the best representation of the spread of this data as it is not affected by outliers because it measures the ~~range of Q1-Q3~~ spread of data between Q1-Q3 only. This is especially important for this data as the difference between the outlier and the second largest number is so high ($40 - 11 = 29$).

Q4)

	D1	D2	D3	D4	D5
17	17	19	19	20	20
22	23	25	25	26	26
	D6	D7	D8	D9	

$$\begin{aligned}
 a) D7 &= \frac{25 + 26}{2} \\
 &= \frac{51}{2} \\
 &= 25.5
 \end{aligned}$$

$$\begin{aligned}
 b) P90 &= D9 = \frac{28 + 28}{2} \\
 &= \frac{56}{2} \\
 &= 28
 \end{aligned}$$

Q5) Using the statistical mode on my calculator, the population standard deviation (s) of this data is 7.1. ~~X~~ 0.8906... Contact us if you are not sure on your calculator in STATS mode.

Q6) An outlier is a score that is either:
 * less than $Q1 - 1.5 \times IQR$ or
 * greater than $Q3 + 1.5 \times IQR$

$$Q1 = 51$$

$$Q3 = 57$$

$$IQR = Q3 - Q1$$

$$= 57 - 51$$

$$= 6$$

$$Q1 - (1.5 \times IQR)$$

$$= 51 - (1.5 \times 6)$$

$$= 51 - 9$$

$$= 42$$

$$Q3 + (1.5 \times IQR)$$

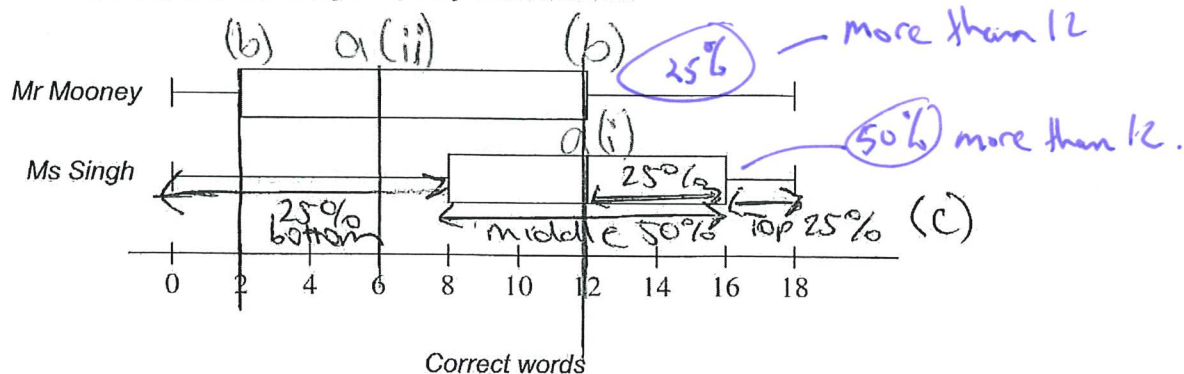
$$= 57 + (1.5 \times 6)$$

$$= 57 + 9$$

$$= 66$$

With this data, a score is an outlier if
 * less than 42 or greater than 66,
 therefore B (41) is an outlier.

- 7 The box plots below show the summary results of two primary school classes in a spelling test consisting of 20 very difficult words.



- What is the median number of correct words for the students in
 - Ms Singh's class?
 - Mr Mooney's class?
- What is the interquartile range for Mr Mooney's class?
- What percentage of students in Ms Singh's class answered 12-18 words correctly?
- Which of the data sets shown is negatively skewed? Give a reason for your answer.
- Which class had the better results? Give reasons referring to the medians and relevant percentages.

See answers to above questions on pages 6-7

Q7)

a)

i) 12 ✓

ii) 6 ✓

b) $Q_1 = 2$ $Q_3 = 12$ $IQR = Q_3 - Q_1$ ✓ $= 12 - 2$ $= 10$ ✓c) $25 + 25 = 50\%$ ✓

d) The data set of Ms Singh's class is negatively skewed as the tail points towards the left and the lower scores. ✓

e) Mr Mooney

Lower extreme = 0

 $Q_1 = 2$ $Q_3 = 12$

Upper extreme = 18

Median = 6

Ms Singh

Lower extreme = 0

 $Q_1 = 8$ $Q_3 = 16$

Upper extreme = 18

Median = 12

~~Q7~~ Q7) (Continued)

e) Mr Mooney's IQR

$$= 12 - 2$$

$$= 10$$

Ms Singh's IQR

$$= 16 - 8$$

$$= 8$$

Ms Singh's class had the better results as the median was 12 compared to 6 for Mr Mooney's class. Although Mr Mooney's class had the larger IQR and more students scored higher in the top 25%, 50% of Ms Singh's class spent more words correctly than 50% of Mr Mooney's class. A little under here??

Q8) 50% of Mr Singh's class score more than 12 words correct compared to only 25% in other class

a) Hourly Wage	Class Centre	Frequency		
14-18	16	44	$\frac{14+18}{2}$	$\frac{24+28}{2}$
19-23	21	35	$= \frac{32}{2}$	$= \frac{52}{2}$
24-28	26	13	$= 16$	$= 26$
29-33	31	8	$\frac{19+23}{2}$	$\frac{29+33}{2}$
			$= \frac{42}{2}$	$= \frac{62}{2}$
			$= 21$	$= 31$

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1mm Squares

Q8) (continued)

b) $44 + 35 + 13 + 8$
 $= 100$

c) With a frequency of 44, 14-18 is the modal class.

d)

Hourly Wage	Class Centre (x)	Frequency (f)	(fx)
14-18	16	44	704
19-23	21	35	735
24-28	26	13	338
29-33	31	8	248
TOTALS	=	100	2025

Mean = $\frac{2025}{100}$

= \$20.25

Excellent, Rachel!

Section B: World Locations & Times

Q1)

a) $(0^\circ, 0^\circ)$

← put brackets around the coordinates

b) $0^\circ, 25^\circ E$ ✗ $P(25^\circ N, 100^\circ E)$

check this Rachel

Q2)

a) $34^\circ S - 31^\circ S = 3^\circ$ ✓

b) North ✓

Q3)

a) Boston & Sofia ✓

b) Santiago ✓

c) $71^\circ + 23^\circ = 94^\circ$ ✓Q4) Melbourne ($37^\circ S, 145^\circ E$)

4° due east of Melbourne

 $145 + 4 = 149$ $= (37^\circ S, 149^\circ E)$ ✓

Q5)

a) 1140 = 11:40 am ✓

b) 2215 = 10:15 pm ✓

Q6) Movie starts - 9:04pm
Movie finishes - 10:48pm

$$10:00 - 9:04 = 56 \text{ mins}$$

$$10:48 - 10:00 = 48 \text{ mins}$$

$$56 + 48 = 104 \text{ mins}$$

The movie is 104 mins long.

ie. 1 hour 44 mins

Q7)

a) Next available train at Epping after Ali arrives at 5:45am is the 5:47am train. If Ali catches this train he will get to Strathfield at 6:09am.

b) James arrives at Burnwood at 6:56am
 $06:56 - 06:35 = 21 \text{ mins}$

c) $07:12 - 29 \text{ mins} = 06:43 \times$
 $07:08 - 29 \text{ mins} = 06:39 - \text{West Ryde}$
 $06:56 - 29 \text{ mins} = 06:27 \times$
 $06:53 - 29 \text{ mins} = 06:24 - \text{West Ryde}$
 $06:38 - 29 \text{ mins} = 06:09 - \text{West Ryde}$
 $06:27 - 29 \text{ mins} = 05:58 \times$
 $06:23 - 29 \text{ mins} = 05:54 - \text{West Ryde}$
 $05:56 - 29 \text{ mins} = 05:27 \times$
 $05:53 - 29 \text{ mins} = 05:24$
 ↓
 West Ryde

Q7) (Continued)

c) $05:27 - 29 \text{ mins} = 04:58 \times$

$05:23 - 29 \text{ mins} = 04:54$ - West Ryde

$04:28 - 29 \text{ mins} = 03:59 \times$

Rahul got on the train at West Ryde Station. ✓

4 d) The next train from Eastwood to Central is at 5:50am.

$0556 - 0533 = 23 \text{ mins}$ ✓

$0623 - 0550 = 33 \text{ mins}$

~~Journey~~ $33 - 23 = 10 \text{ mins}$ ✓

This journey was 10 mins longer compared to the 5:33am train journey.

Q8) Western Australia does not participate in daylight saving time, this means WA is 3 hours behind NSW on December 3.

Therefore $8:30 \text{ am} - 3 \text{ hours}$
 $= 5:30 \text{ am}$ ✓

It is 5:30am in WA.

Q9) Sydney is +10 hours from UTC
 New York is -5 hours from UTC
 Time difference = 10 + 5
 = 15 hours

New York is 15 hours behind Sydney.

Sydney, 11:30am on Thursday.

$$11:30 - 11.5 \text{ hrs} = 00:00 \text{ Thurs}$$

$$15 - 11.5 \text{ hrs} = 3.5 \text{ hrs}$$

$$00:00 - 3.5 \text{ hrs} = 2030 \text{ Wed}$$

It is 2030 (8:30 pm) on Wednesday
 in New York.

Q10)

a) 1:10 pm Tuesday = 1310

$$00:00 \text{ (Wed)} - 13:10 \text{ (Tues)} = 10 \text{ hrs, } 50 \text{ mins}$$

$$08:45 \text{ (Wed)} - 00:00 \text{ (Wed)} = 8 \text{ hrs, } 45 \text{ mins}$$

$$50 \text{ mins} + 45 \text{ mins} = 95 \text{ mins}$$

$$= 1 \text{ hr, } 35 \text{ mins}$$

$$10 \text{ hrs} + 8 \text{ hrs} + 1 \text{ hr} + 35 \text{ mins}$$

$$= 19 \text{ hours, } 35 \text{ mins}$$



Q1b) (Continued)

b) Arrival time in Sydney time is 0845.

Sydney is +10 hours from UTC

Athens is +2 hours from UTC

Time difference = $10 - 2$

= 8 hours

Greece is 8 hours behind Sydney.

$0845 - 8 \text{ hours} = 00:45$

The local time in Athens when Christos arrives is 12:45 am on Wednesday. ✓

Q11) Vancouver is -8 hours from UTC

Tokyo is +9 hours from UTC

Time difference is $8 + 9 = 17$ hours

Vancouver is 17 hours behind Tokyo.

Vancouver, 6:00 am, Friday

$0600 + 17 \text{ hours} = 2300$

= 11:00 pm

Akira should log on to chat to Emiko at 11:00 pm. ✓

