

## Core

## Question 1

In a small survey, twenty-five Year 8 girls were asked what they did (walked, sat, stood, ran) for most of the time during a typical school lunch time.

Their responses are recorded below.

sat	stood	sat	ran	sat
walked	walked	sat	walked	ran
sat	walked	walked	walked	ran
walked	ran	walked	ran	walked
ran	sat	ran	ran	walked

Use the data to

- a. complete the following frequency table

Activity	Frequency
walked	10
sat or stood	<del>16</del> 7
ran	8
<b>Total</b>	25

1 mark

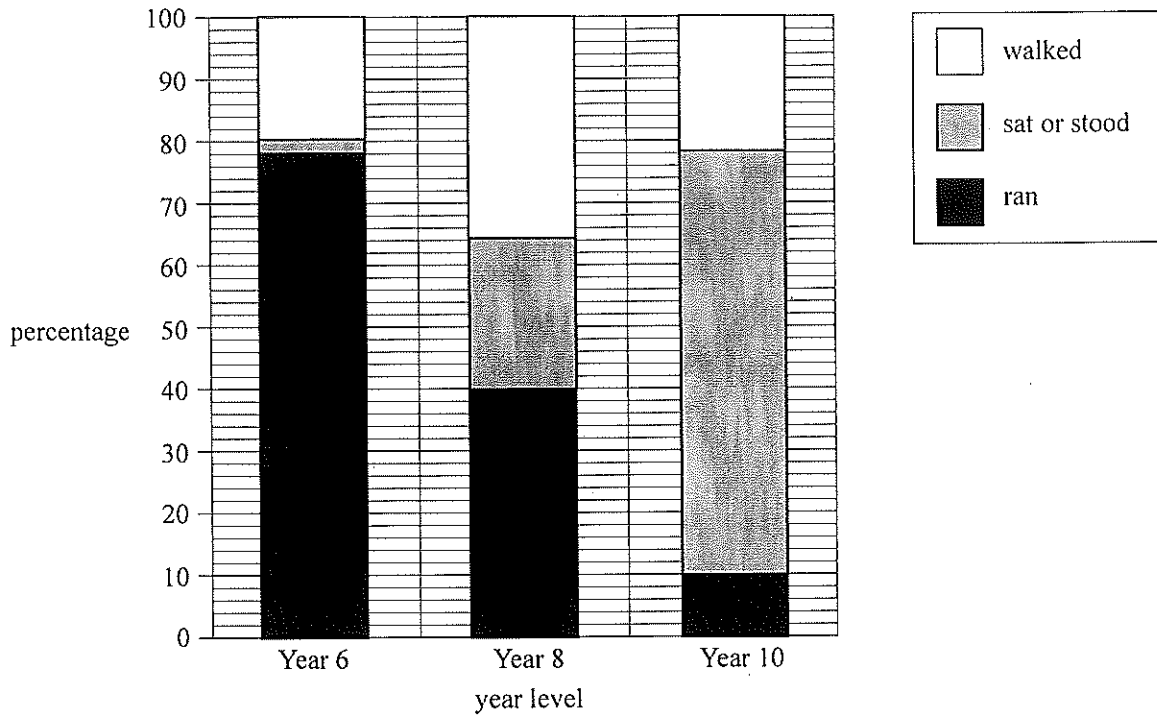
- b. determine the percentage of Year 8 girls who ran for most of the time during a typical school lunch time.

$$\frac{8}{25} \times 100 = 32\%$$

1 mark

### Question 2

In a larger survey, Years 6, 8 and 10 girls were asked what they did (walked, sat, stood, ran) for most of the time during a typical school lunch time. The results are displayed in the percentage segmented bar chart below.



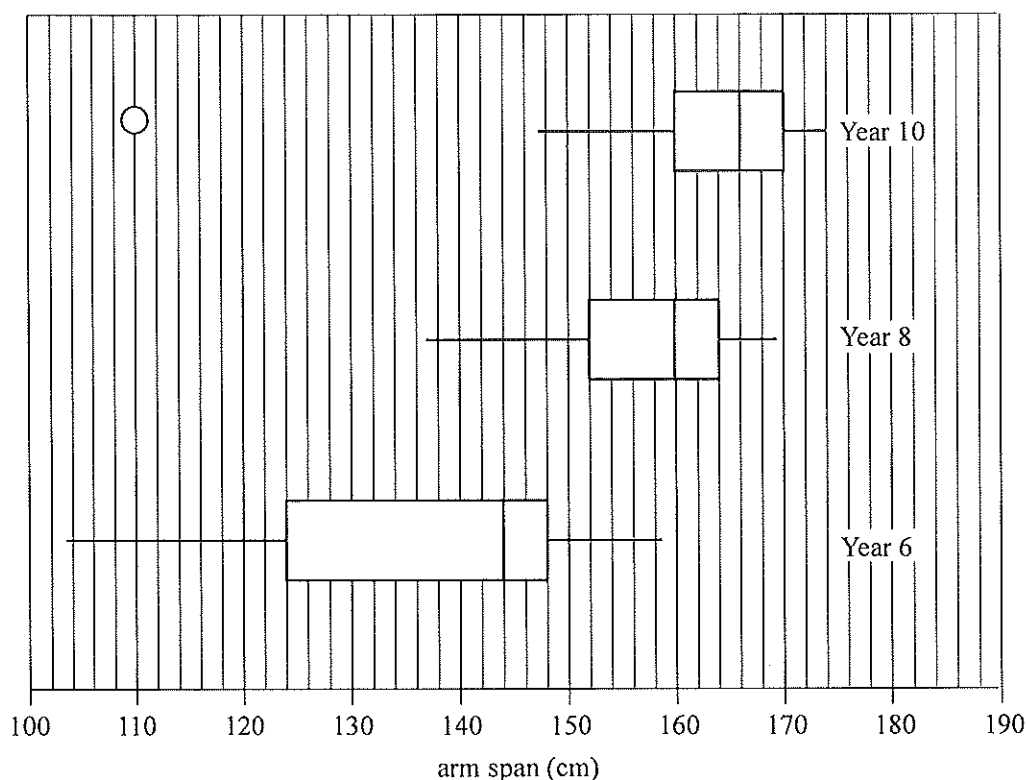
Does the percentage segmented bar chart support the opinion that, for these girls, the lunch time activity (walked, sat or stood, ran) undertaken is associated with year level? Justify your answer by quoting appropriate percentages.

Yes, the percentage bar chart does support the conclusion that activity is associated with year level. In Year 6, only about 2% of girls sat or stood, while in Year 8, 24% sat or stood and in Year 10, 68% sat or stood.

2 marks

**Question 3**

The arm spans (in cm) were also recorded for each of the Years 6, 8 and 10 girls in the larger survey. The results are summarised in the three parallel box plots displayed below.



- a. Complete the following sentence.

The middle 50% of Year 6 students have an arm span between  $\boxed{124}$  and  $\boxed{148}$  cm.

1 mark

- b. The three parallel box plots suggest that arm span and year level are associated.

Explain why.

As the year level increases, the median arm span increases

1 mark

- c. The arm span of 110 cm of a Year 10 girl is shown as an outlier on the box plot. This value is an error. Her real arm span is 140 cm. If the error is corrected, would this girl's arm span still show as an outlier on the box plot? Give reasons for your answer showing an appropriate calculation.

$$\text{Lower outlier limit} = Q_1 - 1.5 \times IQR$$

$$= 160 - 1.5 \times 10 = 145$$

Since  $140 < 145$ , it will still be shown as an outlier.

2 marks

Alternative answer: As the year level increases, the IQR decreases.

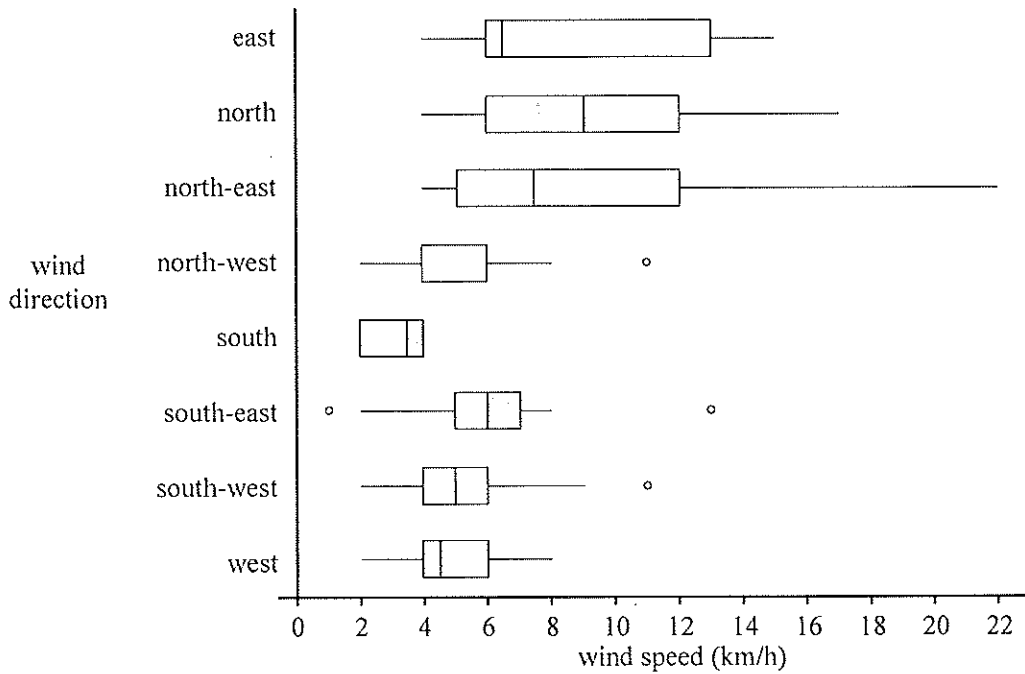
Core – continued

**Question 3**

A weather station records the wind speed and the wind direction each day at 9.00 am.

The wind speed is recorded, correct to the nearest whole number.

The parallel boxplots below have been constructed from data that was collected on the 214 days from June to December in 2011.



a. Complete the following statements.

The wind direction with the lowest recorded wind speed was

south-east

The wind direction with the largest range of recorded wind speeds was

north-east

1 mark

b. The wind blew from the south on eight days.

Reading from the parallel boxplots above we know that, for these eight wind speeds, the

first quartile	$Q_1 = 2$ km/h
median	$M = 3.5$ km/h
third quartile	$Q_3 = 4$ km/h

Given that the eight wind speeds were recorded to the nearest whole number, write down the eight wind speeds.

2, 2, 2, 3, 4, 4, 4, 4

1 mark

$Q_1 = 2$       Median = 3.5       $Q_3 = 4$

The information in the table below refers to the question on the next page

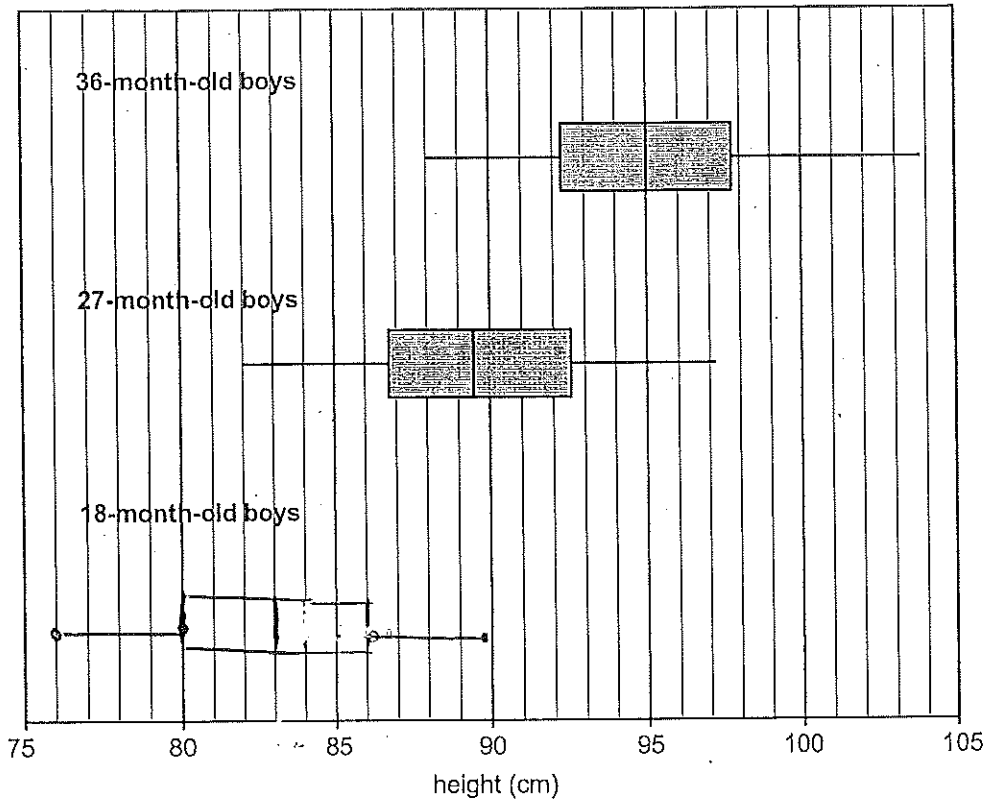
Table 1 shows the heights (in cm) of three groups of randomly chosen boys aged 18 months, 27 months and 36 months respectively.

Table 1.

		height (cm)		
	18 months	27 months	36 months	
	76.0	82.0	88.0	
	78.5	83.1	88.8	
	78.6	84.0	90.0	
	80.0 $Q_1$	86.8	92.3	
	80.5	87.2	93.0	
	81.2	87.6	94.1	
	82.8	88.3	94.2	
	83.2	90.7	95.8	
	83.4	91.0	96.9	
	83.7	92.3	97.1	
	85.8 $Q_3$	92.5	97.8	
	86.6	93.1	99.2	
	87.3	94.8	100.6	
	89.8	97.2	103.8	

Median  
= 83

Using the data from Table 1, boxplots have been constructed to display the distributions of heights of 36-month-old and 27-month-old boys as shown below.



- d. Complete the display by constructing and drawing a boxplot that shows the distribution of heights for the 18-month-old boys.

2 marks

- e. Use the appropriate boxplot to determine the median height (in centimetres) of the 27-month-old boys.

89.5 cm

1 mark

The three parallel boxplots suggest that *height* and *age* (18 months, 27 months, 36 months) are **positively** related.

- f. Explain why, giving reference to an appropriate statistic.

As the age bracket increases, the median increases (from 83.0 cm for Age 18 months to 89.5 cm at age 27 months to 95 cm at age 36 months).

1 mark