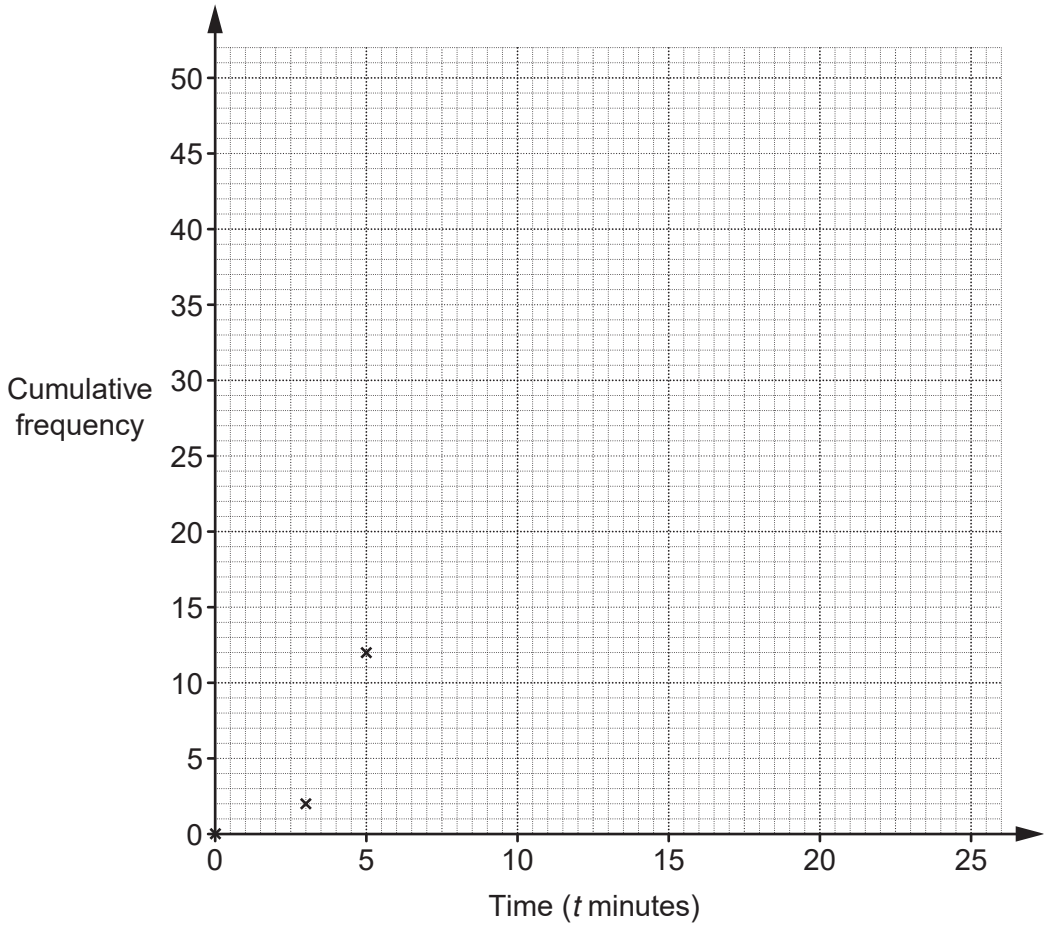
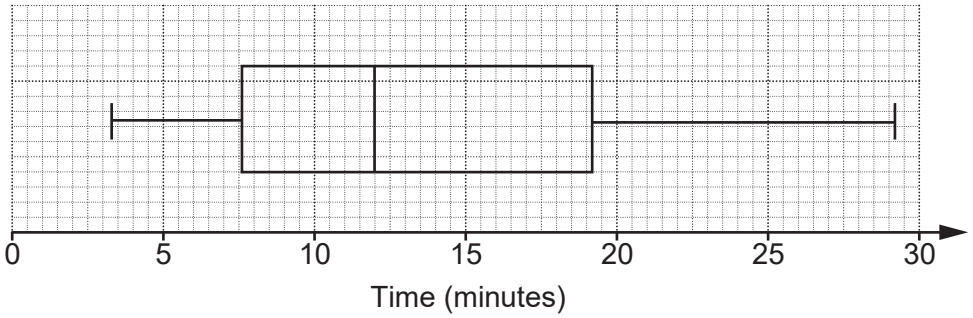
1 Marika Brown likes to play a game of solitaire.
This table summarises the times that she took to complete 50 games.

Time (t minutes)	Frequency
$0 < t \leqslant 3$	2
$3 < t \leqslant 5$	10
$5 < t \leqslant 10$	18
$10 < t \leqslant 15$	12
$15 < t \leqslant 20$	5
$20 < t \leqslant 25$	3

(a) Complete the **cumulative frequency** diagram to represent her times. **[4]**



(b) Paul Brown also plays solitaire.
This box plot summarises the times that he took to complete 50 games.



Complete the following statements.
Use numerical evidence from both diagrams to compare the two sets of times.
State the evidence you use.

..... has a shorter average time because .....

.....

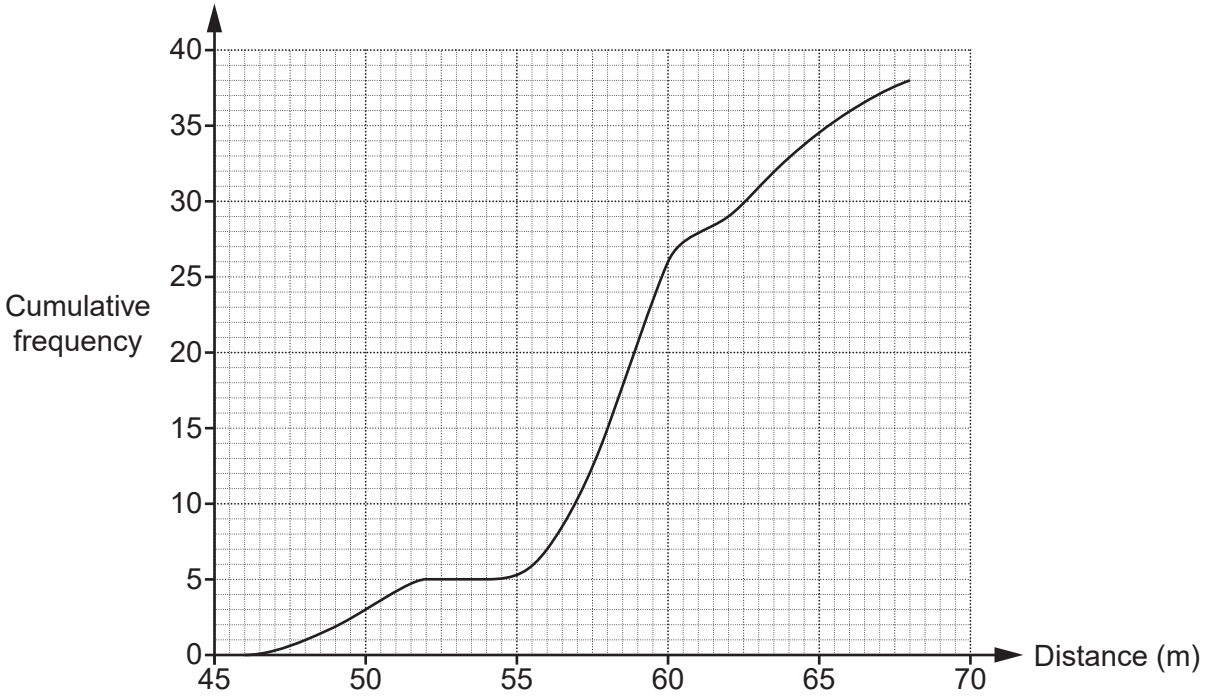
..... **[2]**

..... has more consistent times because .....

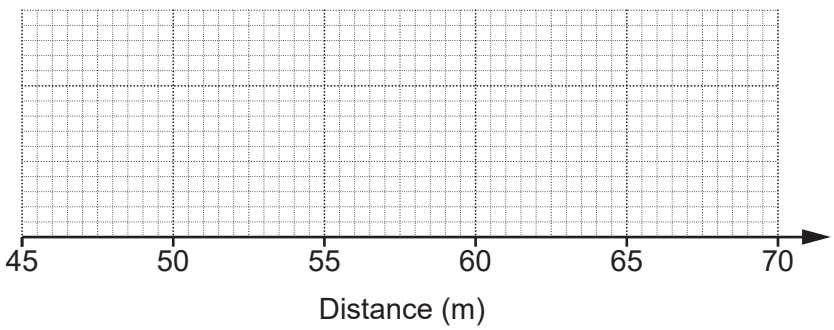
.....

..... **[2]**

2 **(a)** This cumulative frequency graph represents the distances thrown by the 38 women in the qualifying round of the javelin at the 2012 Olympics.



(i)



On the grid above, construct a box plot to represent the distribution of the distances thrown by the 38 women. **[3]**

(ii) Here are some statistics for the distances thrown by the men in the qualifying round of the javelin at these Olympics.

median	78.7 m
interquartile range	7.0 m
range	17.2 m

Jodie says:

"The distances thrown by the men were more consistent than the distances thrown by the women."

Is Jodie correct?

State the values of the statistics that you use to support your decision.

..... because .....

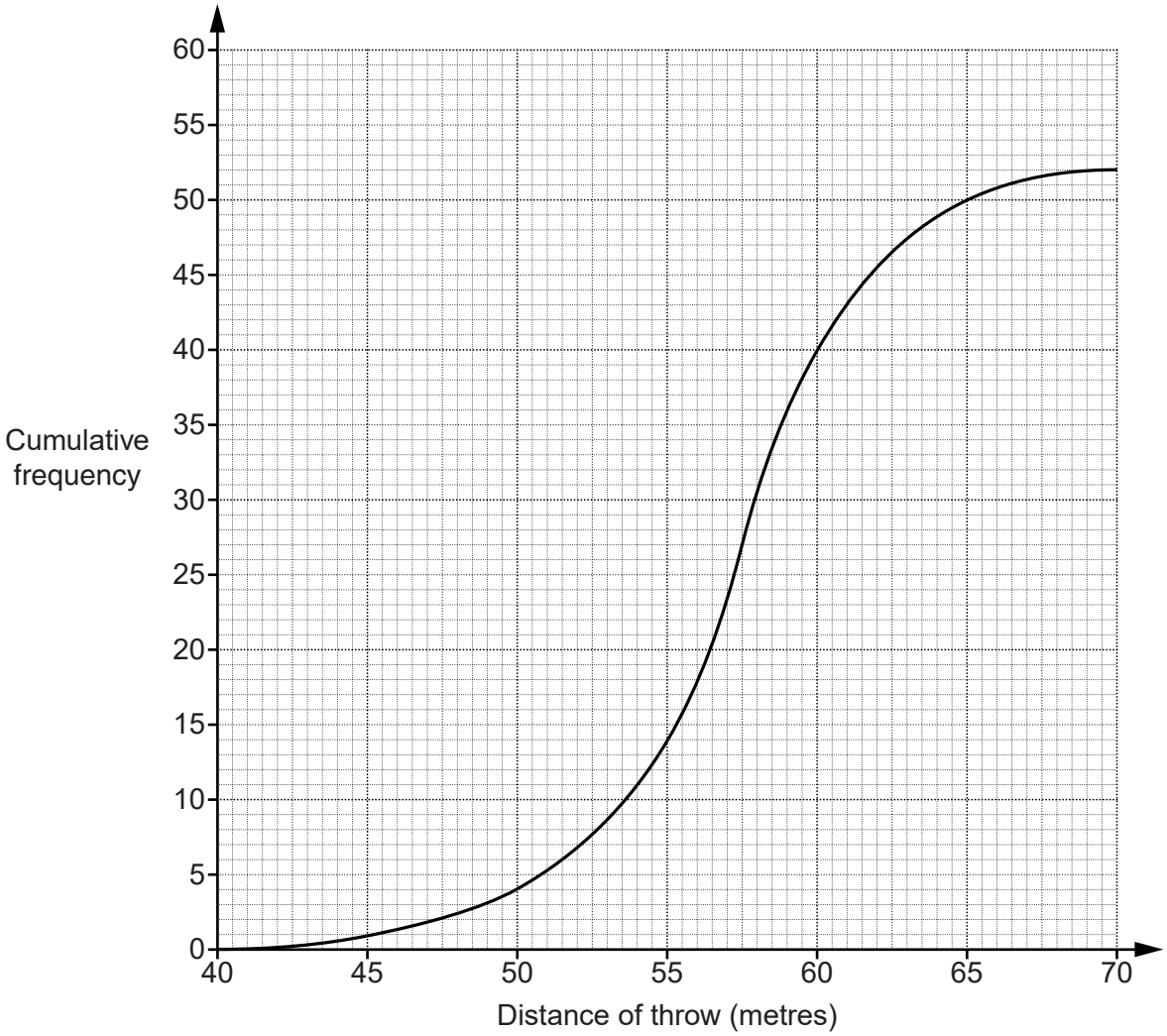
..... **[2]**

(b) In the 50 km walking race for men, the winner finished in a time of 3 h 35 m 59 s.
The slowest man who finished had a time of 4 h 15 m 05 s.

How many seconds slower was he than the winner?

(b) ..... seconds **[2]**

3 (a In the Women's Javelin event at the Beijing Olympics, there was a preliminary round. The distance, in metres, of each competitor's best throw was recorded. This cumulative frequency graph represents the results.



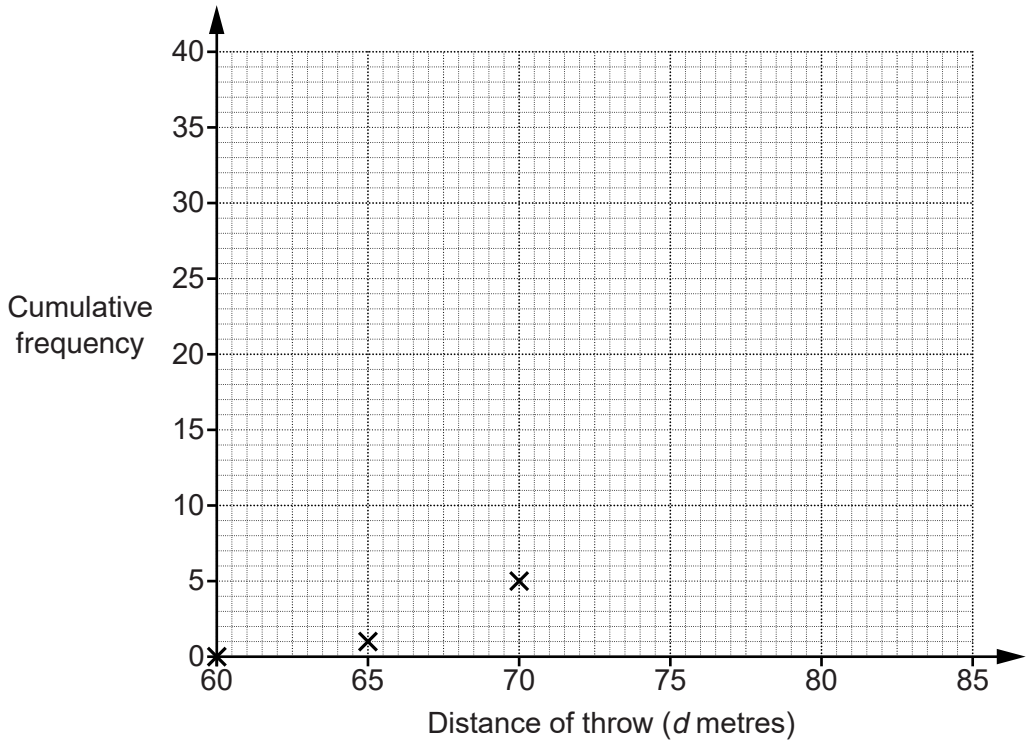
Use the graph to find an estimate of the median distance thrown by the 52 women.

(a) _____ m **[2]**

(b) This table summarises the results for the Men's Javelin preliminary round.

Distance of throw (d metres)	Frequency
$60 \leqslant d < 65$	1
$65 \leqslant d < 70$	4
$70 \leqslant d < 75$	11
$75 \leqslant d < 80$	13
$80 \leqslant d < 85$	8

Complete the **cumulative frequency** graph to represent the Men's Javelin results.



[3]

(c) The interquartile range for the distances thrown by the women was 5.0 m.
Janine says:

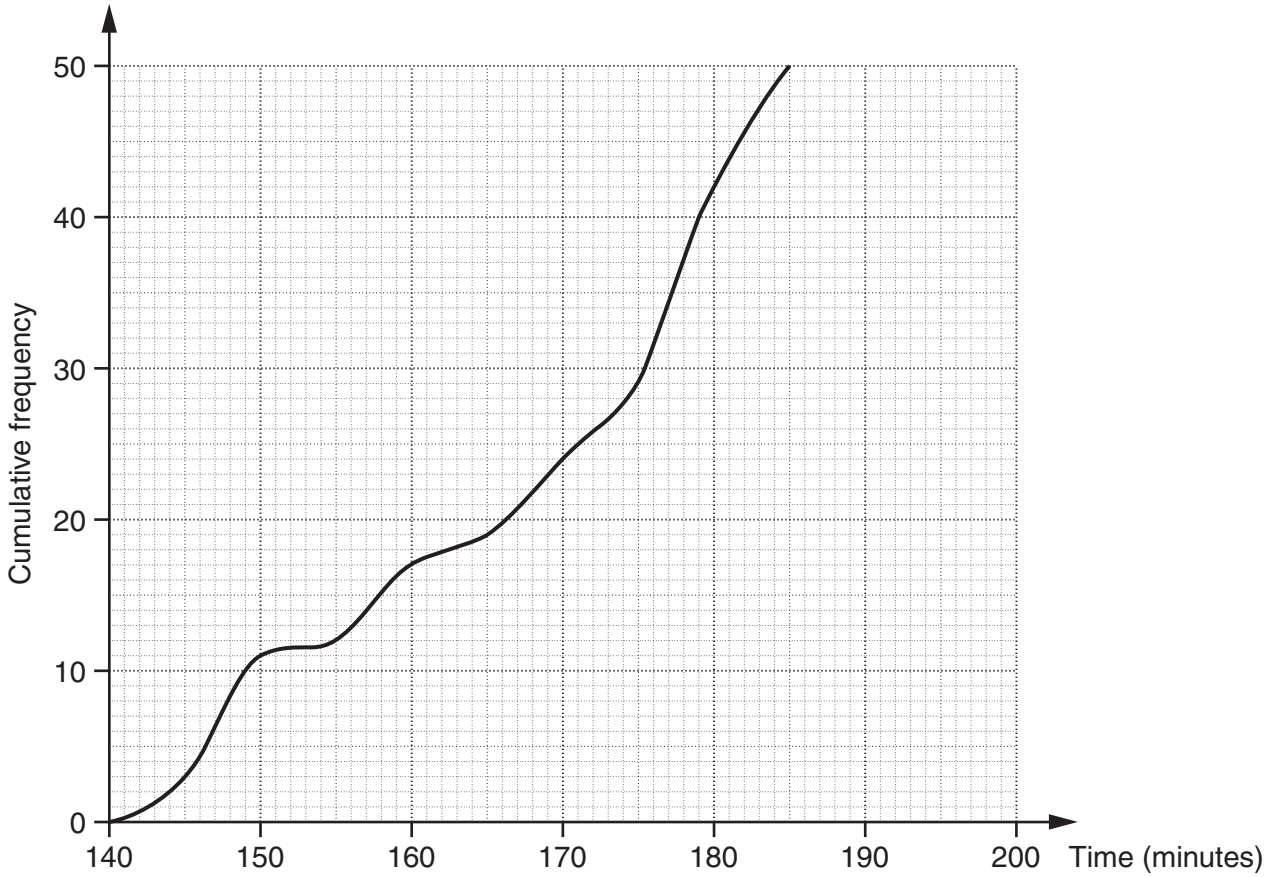
The distances thrown by the women were less varied than those thrown by the men.

Use your graph to find an estimate of the interquartile range for the distances thrown by the men and circle the correct response to Janine's statement.

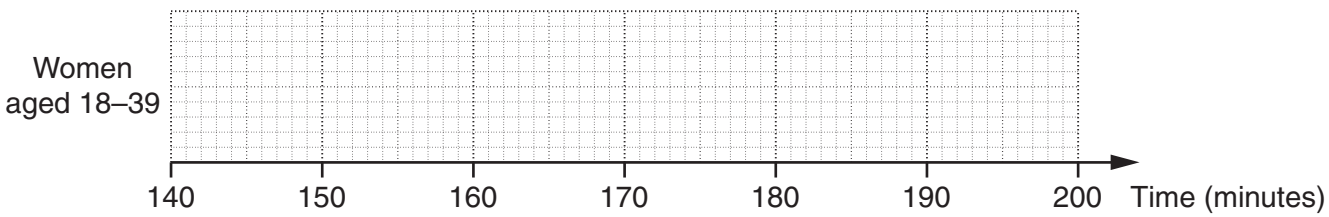
The men's interquartile range is _____ m so Janine's statement is

True False Can't tell **[3]**

4 This cumulative frequency graph represents the times of the first 50 women aged 18–39 to finish the London Marathon in 2009.

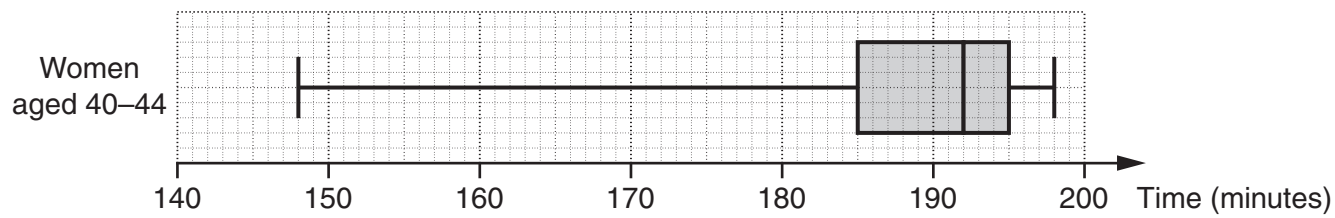


(a)



On the grid above, construct a box plot to represent this distribution. **[3]**

(b) The box plot below represents the times of the first 50 women aged 40–44 to finish the London Marathon in 2009.



Compare the average and spread of the two distributions.
Support your answers with numerical evidence.

1 _____

_____

_____

2 _____

_____

_____ **[4]**

5 The students in two maths groups were each asked to solve a puzzle.

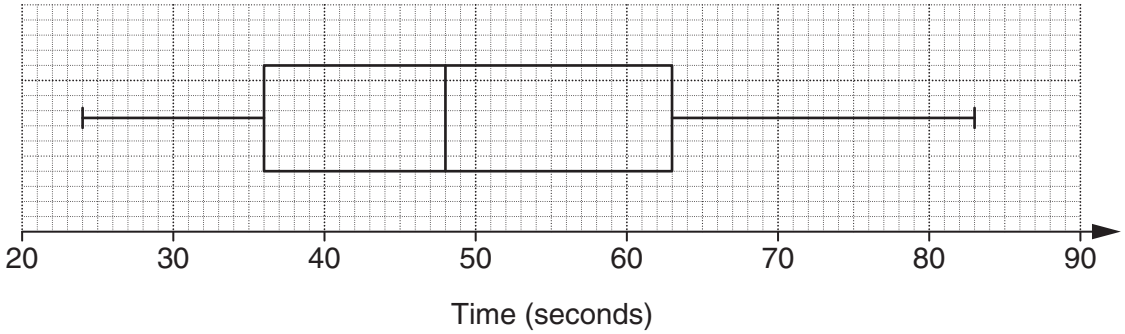
(a) This table summarises the times taken by the 30 members of group 7P.

Time (t seconds)	Frequency
$20 \leqslant t < 30$	3
$30 \leqslant t < 40$	7
$40 \leqslant t < 50$	13
$50 \leqslant t < 60$	6
$60 \leqslant t < 70$	1

Calculate an estimate of the mean time taken by group 7P.

(a) ..... seconds **[4]**

(b) This box plot represents the times taken by members of group 7S.



(i) Find the median time taken by group 7S.

(b)(i) ..... seconds **[1]**

(ii) Find the interquartile range of the times taken by group 7S.

(ii) ..... seconds **[2]**

6 A research project studied two different varieties of daffodil, A and B.
50 bulbs of each variety were grown.
For each bulb, the height of the top of the flower above the soil was measured.

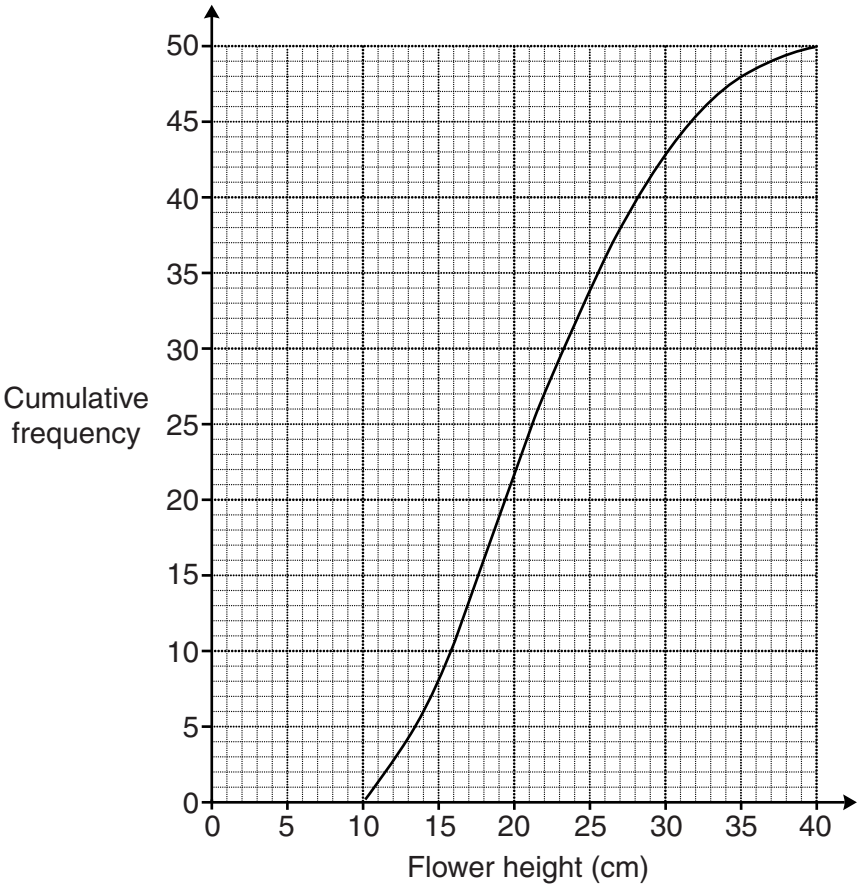
(a) This table summarises the results for variety A.

Flower height ($h$cm)	Frequency
$10 < h \leqslant 15$	14
$15 < h \leqslant 20$	20
$20 < h \leqslant 25$	11
$25 < h \leqslant 30$	5

Calculate an estimate of the mean flower height for variety A.

(a) _____ cm **[4]**

(b) This cumulative frequency diagram represents the results for variety B.



Use the cumulative frequency diagram to answer the following for variety B.

(i) How many bulbs had a flower height of 15 cm or less?

(b)(i) _____ **[1]**

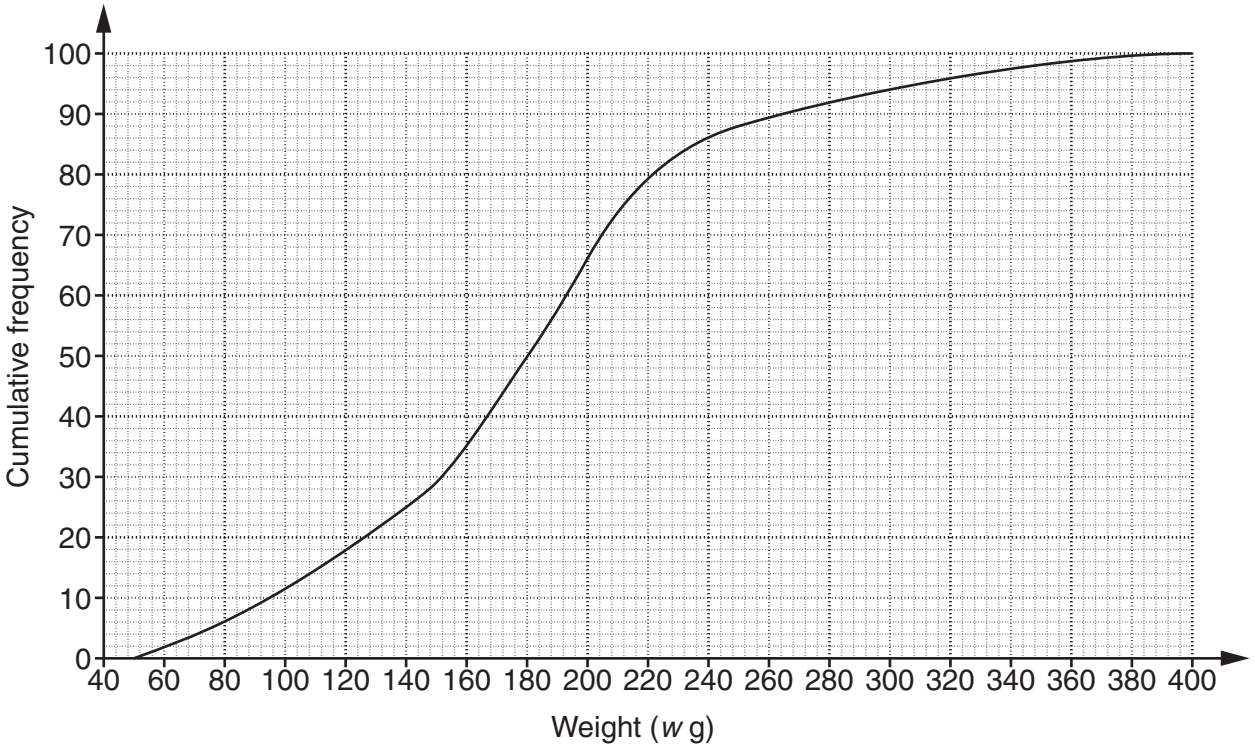
(ii) Find an estimate of the median flower height.

(ii) _____ cm **[1]**

(iii) Find an estimate of the interquartile range of the flower heights.

(iii) _____ cm **[2]**

7 *Pellow* and *Delta* are two varieties of potato.
In a trial, 100 of each variety of potato were weighed.
This cumulative frequency diagram represents the results for the *Pellow* potatoes.



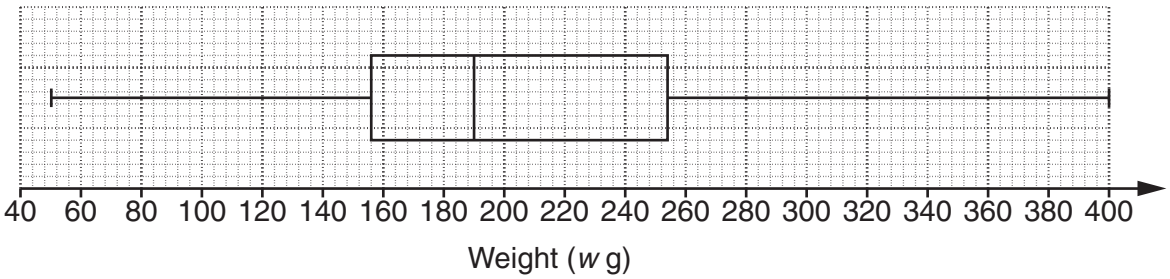
(a) (i) How many of this sample of *Pellow* potatoes weighed 250 g or more?

(a)(i) _____ **[1]**

(ii) Find the interquartile range for these 100 *Pellow* potatoes.

(ii) _____ g **[2]**

This box plot summarises the results for the *Delta* potatoes.



(b) For each of the following situations, recommend which of the two varieties should be used. State the evidence you use in your decision, giving **numerical values**.

(i) Hazel needs potatoes which have a larger weight, on average.

Recommended variety _____

Reason _____

_____ **[2]**

(ii) Richard needs potatoes which are consistent in weight.

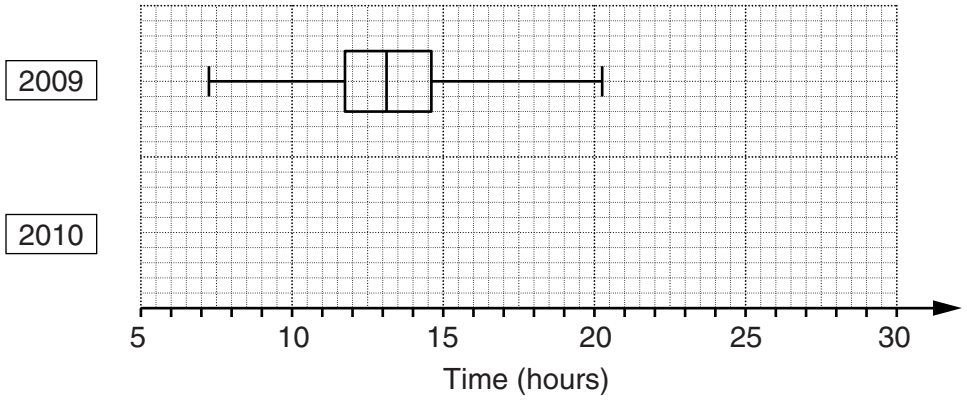
Recommended variety _____

Reason _____

_____ **[2]**

8 This question is about solo swims of the English Channel.
It uses data about the times, in hours, of the successful swims from England to France in 2009 and in 2010.

The boxplot drawn represents the times taken in 2009.



(a) Here is some summary information about the times in 2010.

Shortest time 7.7 hours	Lower quartile 12.7 hours
Range 21.0 hours	Median 14.4 hours
	Interquartile range 4.0 hours

On the grid, draw the boxplot for the times of these channel swims in 2010. **[4]**

(b) Comment on the truth, or otherwise, of each of the following statements.
For each comment, include reasons in your answer. Give values to support your decision, where appropriate.

(i) On average, the swimmers took longer in 2010 than in 2009.

_____

_____ **[1]**

(ii) The swimmers' times were less varied in 2010 than in 2009.

_____

_____ **[1]**

(iii) There were more swimmers in 2010 than in 2009.

_____

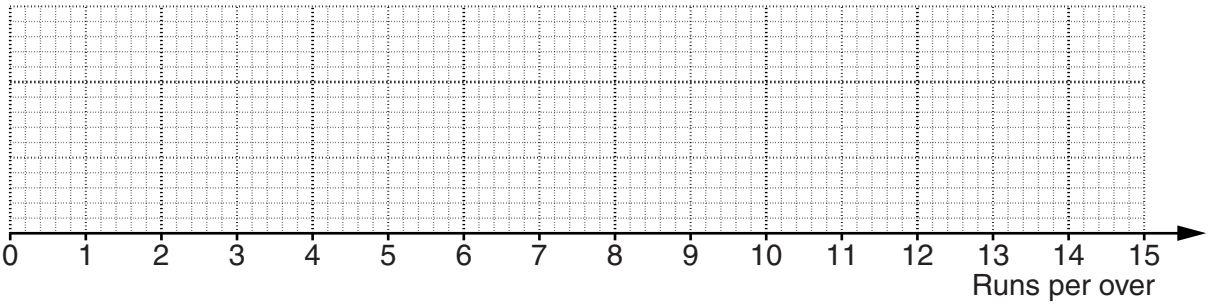
_____ **[1]**

9 In T20 cricket, the number of runs per over scored by a team is important.

This table summarises the number of runs per over scored by team A in its matches in one season.

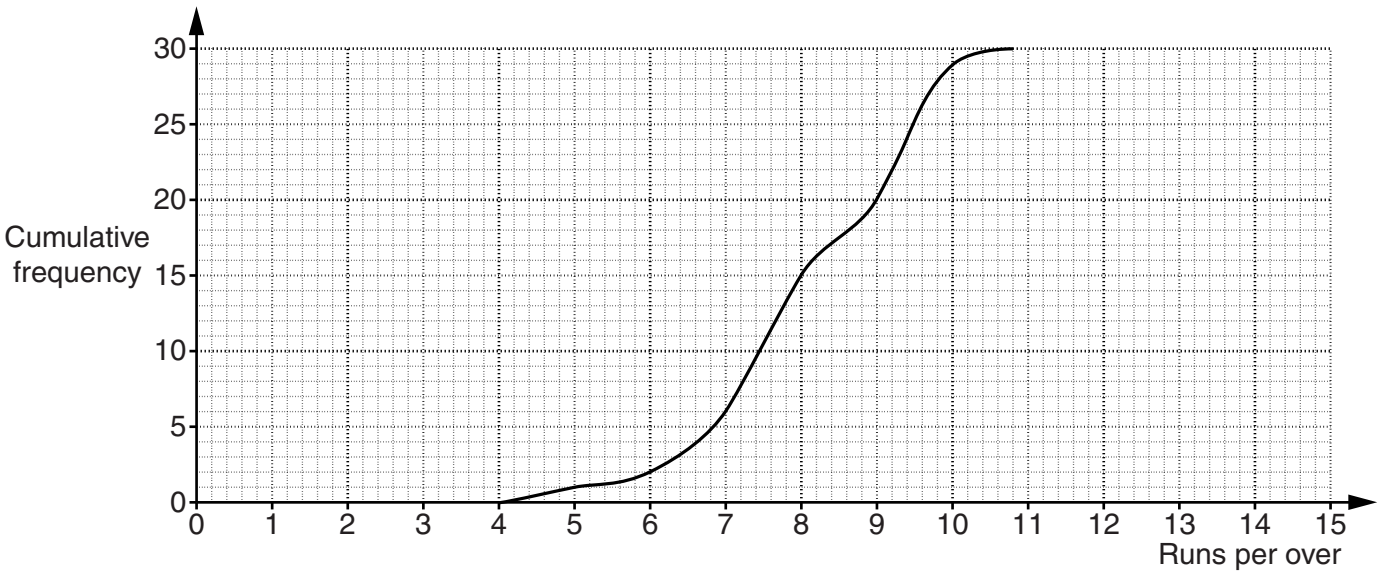
Minimum	4.2
Lower quartile	5.1
Median	7.6
Upper quartile	8.4
Maximum	10.1

(a) Draw a box plot for this information.



[3]

(b) Here is a cumulative frequency diagram.
It gives information about the runs per over scored by team A's opponents in 30 matches.



(i) In how many matches did team A's opponents score 6 runs or less per over?

(b)(i) _____ **[1]**

(ii) Make two comments comparing the number of runs per over scored by team A and by its opponents.
Give numerical evidence for the statistics you use.

Average: _____

_____

_____

Spread: _____

_____

_____ **[4]**

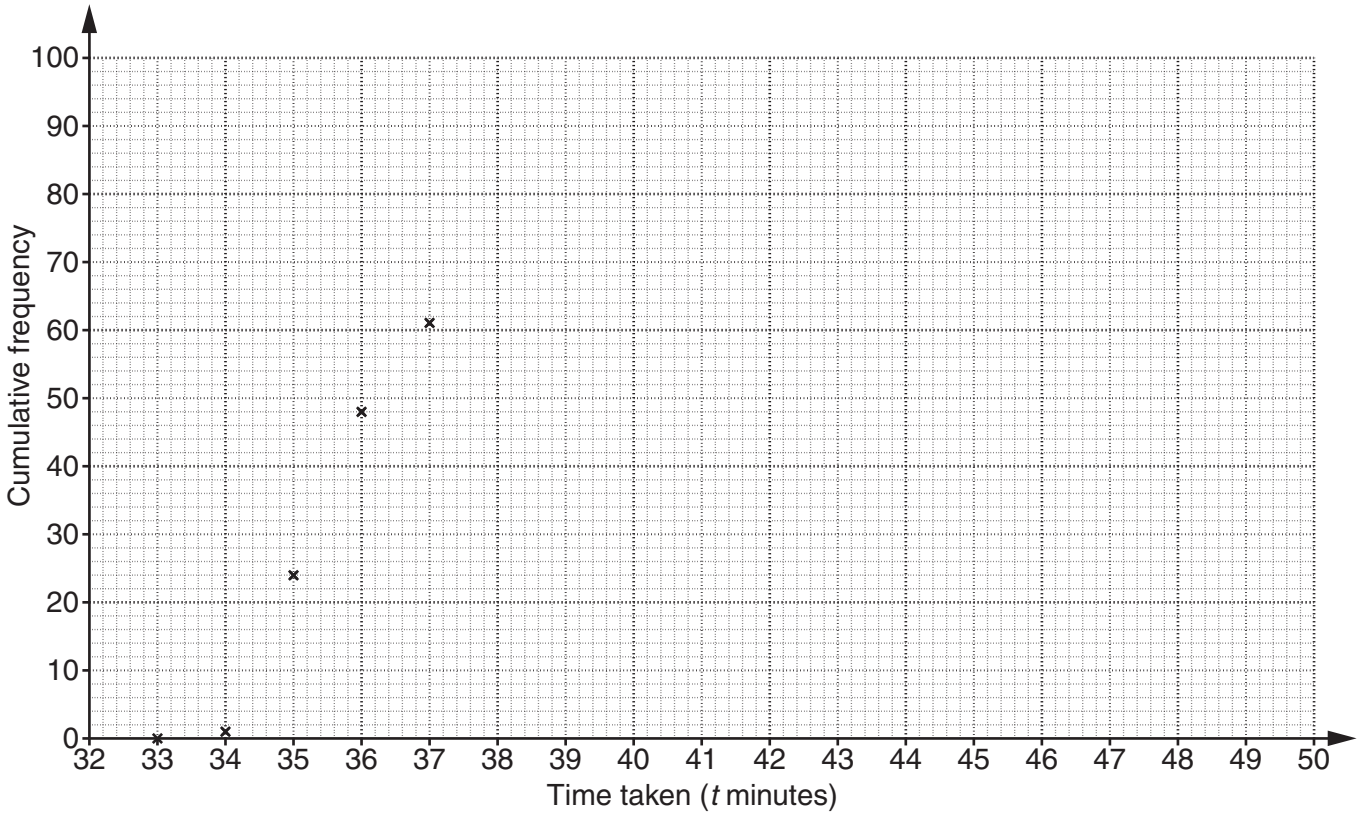
10 This cumulative frequency table summarises the times taken by the 95 competitors who completed the men's 15 km cross-country skiing event in the Winter Olympics of 2010.

Time taken (t minutes)	$t \leqslant 33$	$t \leqslant 34$	$t \leqslant 35$	$t \leqslant 36$	$t \leqslant 37$	$t \leqslant 38$	$t \leqslant 39$	$t \leqslant 40$	$t \leqslant 41$	$t \leqslant 42$	$t \leqslant 45$	$t \leqslant 50$
Cumulative frequency	0	1	24	48	61	70	75	79	80	85	92	95

(a) How many competitors took more than 38 minutes but no more than 39 minutes?

(a) _____ **[1]**

(b) Draw a cumulative frequency diagram to represent this information.
The first five points have been plotted for you.



[2]

(c) Use your diagram to find an estimate of

(i) the median time taken,

(c)(i) _____minutes **[1]**

(ii) the interquartile range of the times taken.

(ii) _____minutes **[2]**

(d) Here are the results for the first three competitors to finish.

Name	Position and medal	Time for race (minutes : seconds)
COLOGNA Dario	1 Gold	33 : 36.3
PILLER COTTRER Pietro	2 Silver	34 : 00.9
BAUER Lukas	3 Bronze	34 : 12.0

How much longer did the bronze medallist take than the gold medallist?
Give the units of your answer.

(d) _____ **[2]**