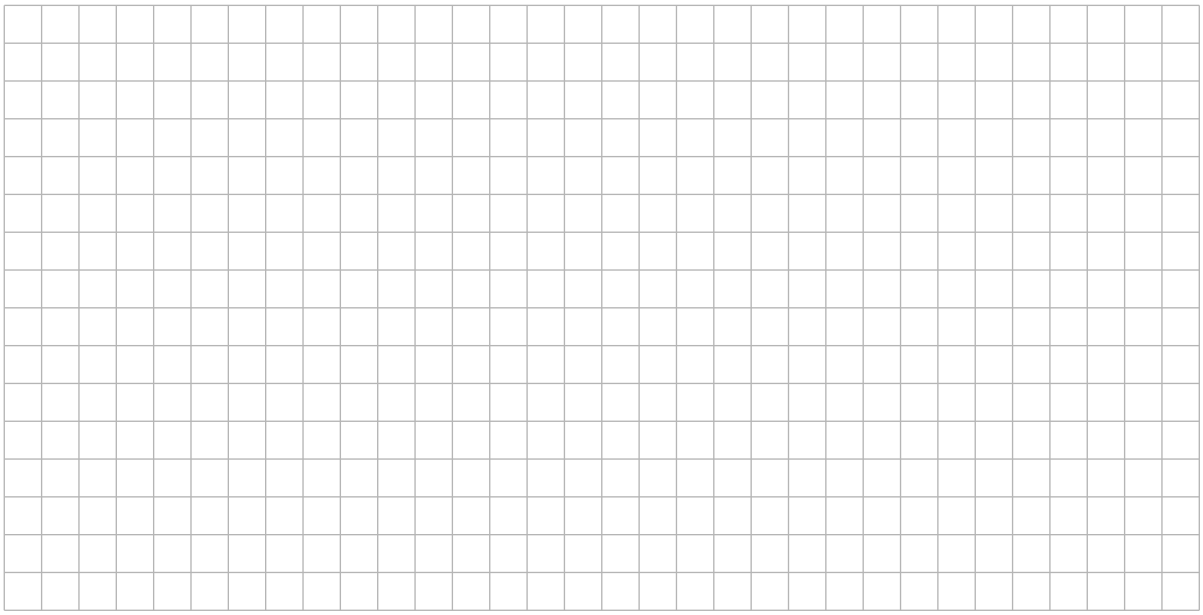
Question LCHL: Descriptive Statistics

To enter a particular college course, candidates must complete an aptitude test. In 2010 the mean score was 490 with a standard deviation of 100. The distribution of the scores on the aptitude test is a normal distribution.

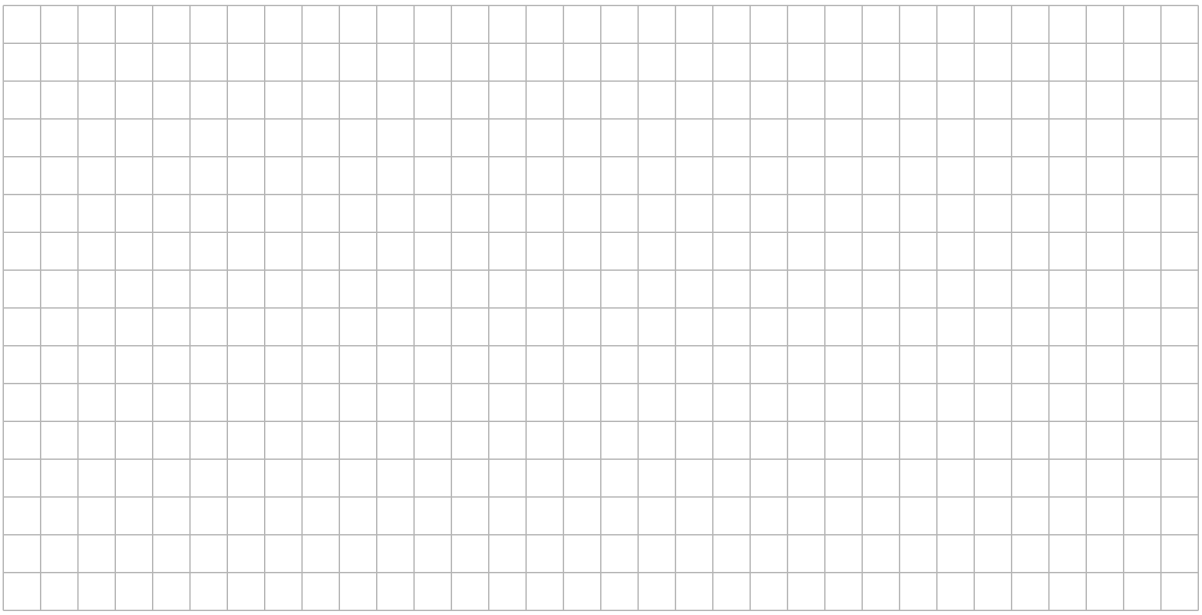
(a) What percentage of candidates scored between 390 and 590 on this aptitude test?

(b) One student scored 795 on this test. How does this student's score compare to the rest of the scores?

(c) The college admits only students who were among the highest 16% of the scores on this test. What score would a student need on this test to be qualified for admission to this college? Explain your answer.



(d) Alice is preparing to sit the aptitude test in 2011. She heard that a score of over 650 would guarantee her a place on the course. She knew 20 people who were going to take the test. Based on the mean and standard deviation in 2010, approximately how many of the people Alice knew were likely to get a score of above 650 and secure a place on the course? Justify your answer.



LCOL: Descriptive Statistics.

David noticed that, when he drank a bottle of sports drink before going out for a run one day, his performance time improved. He set about doing an experiment to see whether drinking the sports drink increases performance when running.

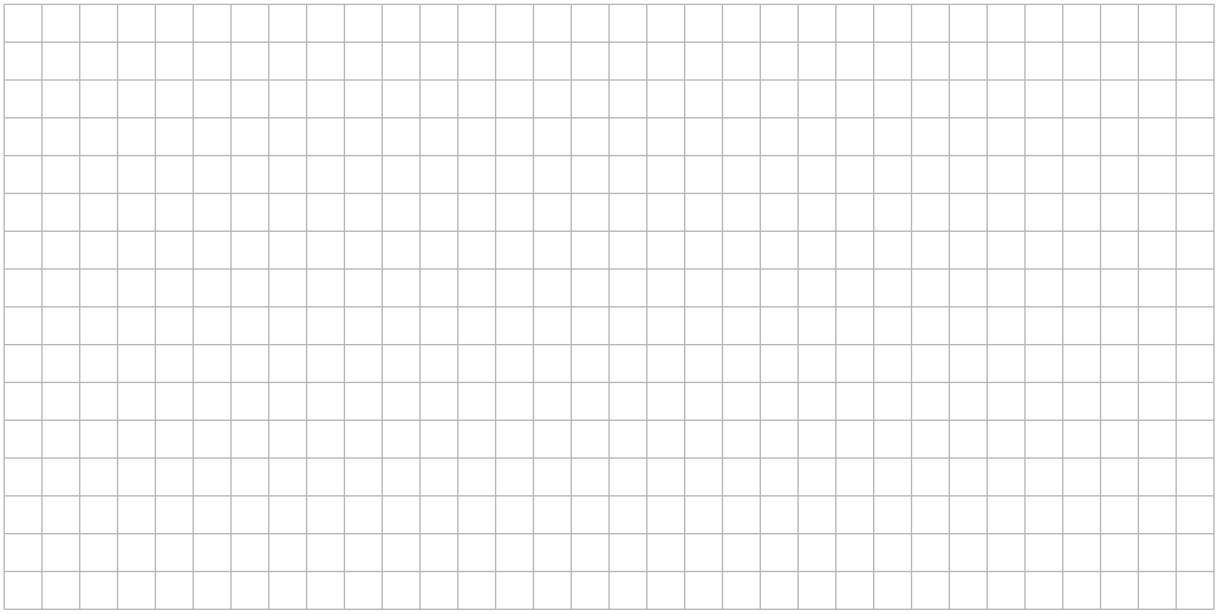
He recorded the times of people in his running club to complete a 5km run without drinking the sports drink and then on another day he recorded the time it took the same people to complete 5km having taken the sports drink.

He recorded the information in a back-to-back stem and leaf plot:

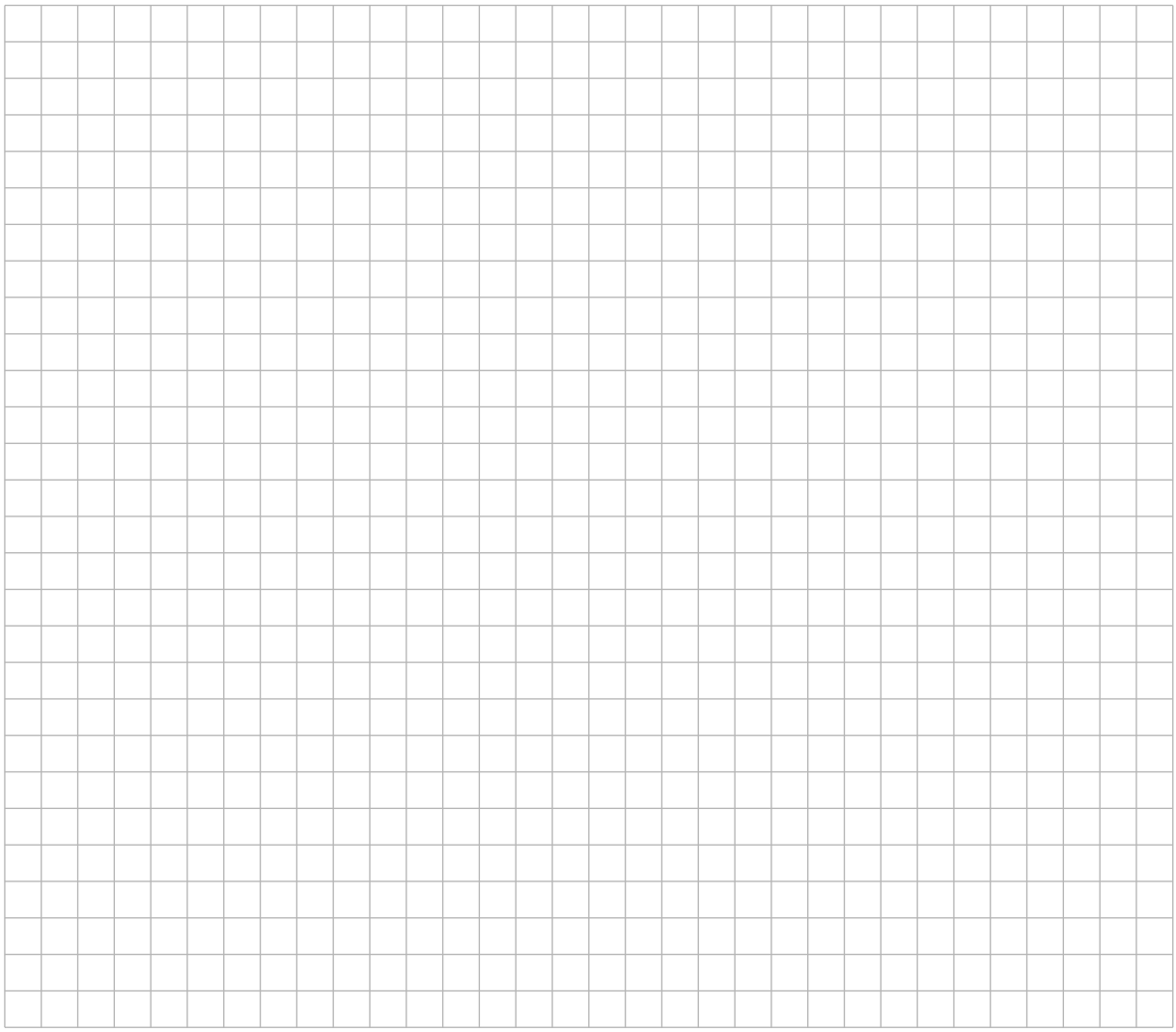
Without taking the sports drink.		**Having taken the sports drink**.
5	20	3 4
1 1 1	21	3 4 7
8 8 4 3 2	22	
	23	1 2 2
	24	0
	25	8
	26	1
	27	
	28	2 3 6 6 7 7
	29	2 4 4 5 5 5 8 9 9
	30	1 3 4 5 6 7 8 8 9
5	31	
6 4 4 3 0 0	32	1 1 4 9
9 9 6 5 4 4 3 3 2 1	33	3 3 3 2
7 7 5 5 6 6 6 1 0	34	5
8 8 8 3 3	35	0 0
7 3 2	36	1
1	37	2
	38	3 5
2 2	39	
4 4 2 0	40	

Key: 32 | 1 means 32.1 minutes

(i) Based on the diagrams approximate the median speed without drinking the sports drink and the median speed having taken the sports drink. What does this information tell you?



(ii) Compare the distributions of each of the data sets above.



(iii) Is there evidence from the diagram to suggest that taking the sports drink improves performance? Justify your conclusions.

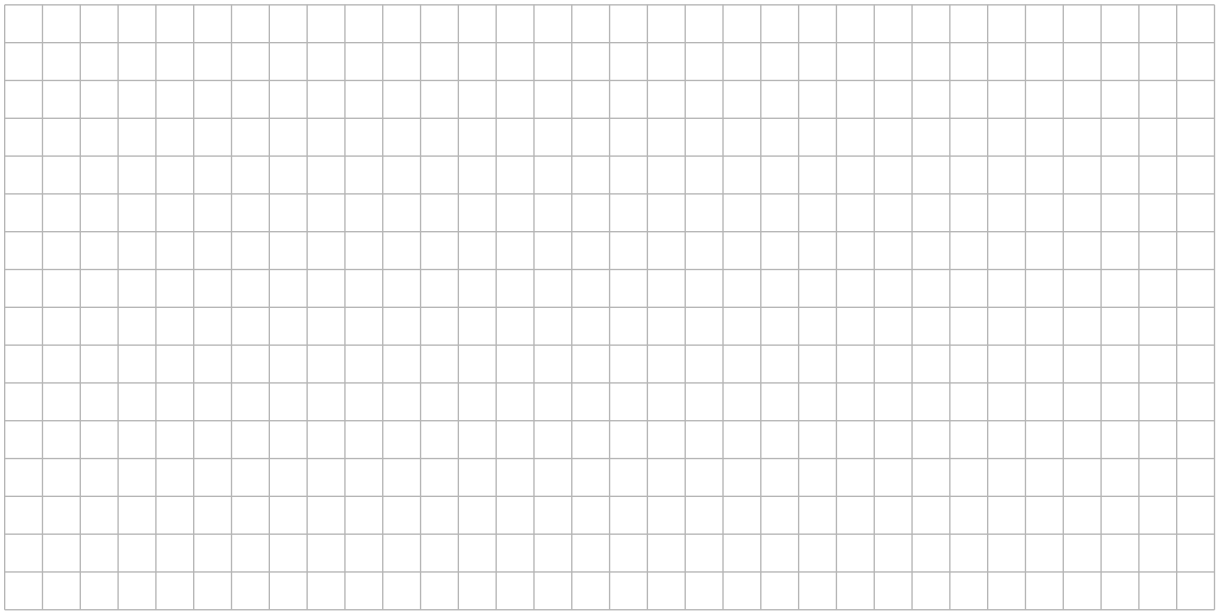
(iv) Make an argument, based on the two data sets, that taking the sports drink does not improve performance.

(v) After completing the experiment, David wondered how accurate his study was. He realised that he had not specified how much of the sports drink the runners should take. He asked 20 of the runners approximately how many millilitres of sports drink they had taken and recorded ithis alongside their time. The results are as follows:

Time (mins)	Sports drink (ml)
20.3	250
21.7	100
21.8	120
24	80
28.6	300
29.4	130
29.5	300
29.9	280
32.1	300
32.1	100
33.2	80
35	220
38.3	180
20.6	100
29.2	200
29.8	250
36.1	80
29.9	120
30.9	240
30.1	280

Display the data in a way that allows you to examine the relationship between the two data sets.

(vi) Is there evidence to suggest that there is a relationship between the time taken to complete 5km and the amount of sports drink taken before the race?



(vii) The correlation coefficient for data in part **(v)** above is one of the following.

Circle the correct correlation coefficient, based on your graph.

A -0.82 **B** 0.13 **C** 0.95 **D** 0.6

JCOL: Descriptive Statistics

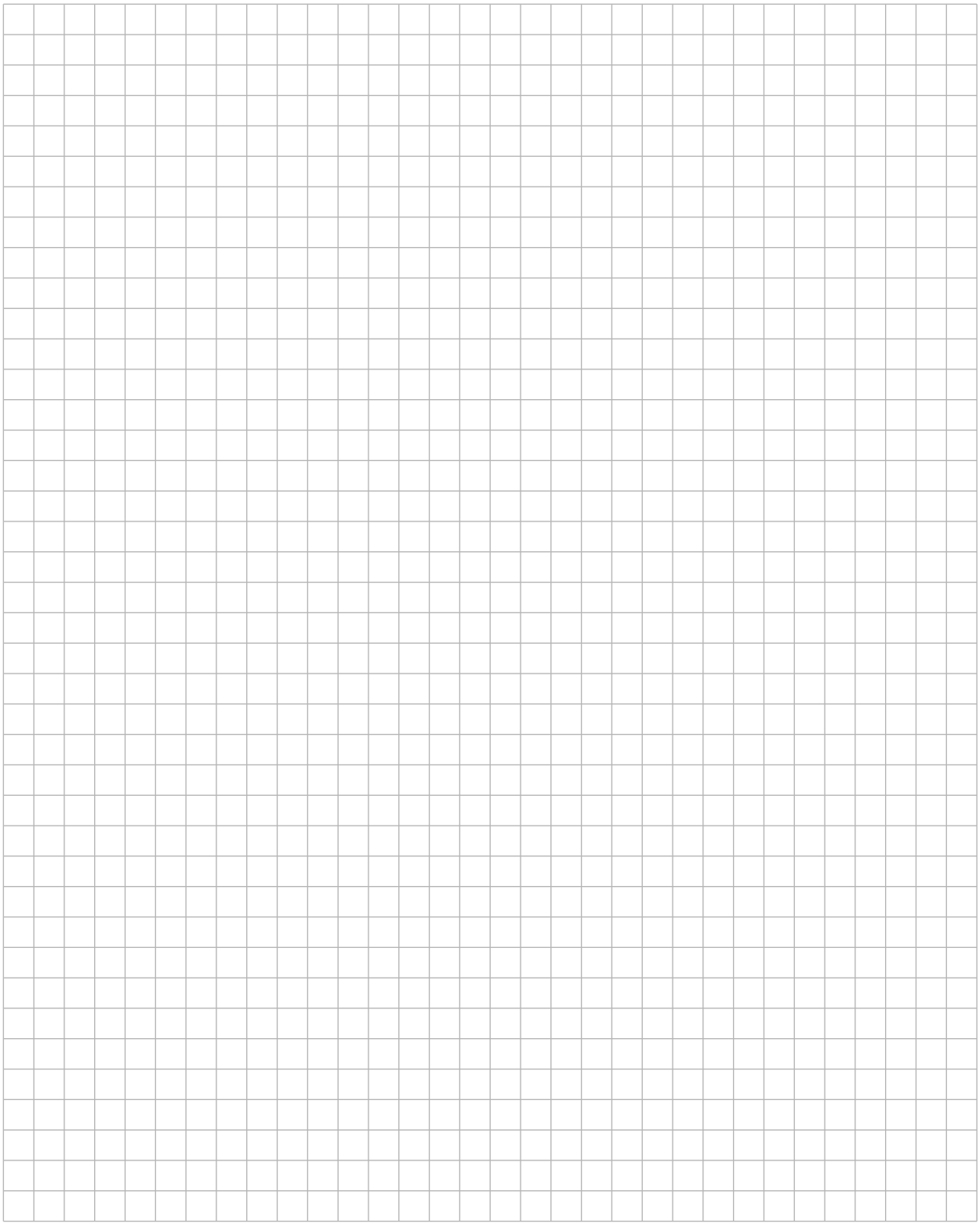
A group of students were asked "*Do you get worried about your exams*?" They were asked to circle one of following to answer the question: Never, Rarely, Sometimes, Frequently.

The data below shows the answers from a sample of boys and girls.

Boys	**Girls**
Frequently	Never
Never	Sometimes
Never	Sometimes
Sometimes	Rarely
Sometimes	Never
Rarely	Frequently
Sometimes	Frequently
Sometimes	Never
Frequently	Sometimes
Never	Rarely
Sometimes	Frequently
Rarely	Rarely
Rarely	Sometimes
Frequently	Frequently
Never	Frequently
Rarely	Frequently
Rarely	Rarely
Frequently	Frequently
Never	Frequently
Frequently	Frequently
Never	Sometimes
Sometimes	Sometimes
Never	Sometimes
Frequently	Never
Rarely	Rarely
Sometimes	Frequently
Rarely	Frequently
Never	Never
Sometimes	Never
Rarely	Frequently

(a) How many students were in each sample?

(b) Display the data in a way which allows you to compare the two samples.



(c) Compare the two sets based on your display.

Note:
When looking at the solution set, click on the "sticky note" for additional comments.