

STEM AND LEAF DIAGRAMS

DRAWING AND INTERPRETING STEM AND LEAF DIAGRAMS. MIXED QUESTIONS WITH STEM AND LEAF DIAGRAMS.

Examination Practice Questions

You should have:

A ruler, protractor, compasses, a pen, pencil, eraser, calculator.
For some questions, you may need tracing paper.

Instructions

- Use **black** ink or ball-point pen.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets.
- Use the number of marks for each question as a guide as to how much time to spend on each question. As a rough guide, you can multiply the number of marks by 1.2 to see how many minutes you should spend on a question.
- Questions been carefully compiled from or modelled on a variety of past papers and will generally get more challenging as the document progresses. Some of the later questions will go beyond the core grade level for this topic.

Advice

- Read each question carefully before you start to answer it.
- Don't forget to have fun.
- Check your answers at the end.

Jay recorded the total number of shots at goal in a season for each of the 20 footballers who scored the most goals in the English Premier League. Here are the results.

89 86 87 79 53 102 74 83 33 60
 51 88 61 45 59 69 38 42 34 70

(Source: www.bbc.co.uk)

(a) Complete the stem and leaf diagram for this information.

3	
4	
5	
6	
7	
8	
9	
10	

Key:

(3)

(b) Find the median.

.....
(2)

(c) Explain why it is not possible to find the mode of Jay's results.

.....

(1)

(d) Find the number of footballers in Jay's results that had fewer than 40 shots at goal.

.....
(1)

Jay knows that on average 57% of these footballers' shots at goal are on target.

Jay says,

"The three footballers with the most number of shots had a total of 159 shots at goal on target".

(e) Is Jay correct?

Give a reason for your answer.

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.....
.....

(2)

The Bolton Boys are a basketball team.

Here is a list of the points scored by the team in 16 games this season.

97 74 89 81 78 85 102 100
76 103 87 101 76 82 98 95

(a) Complete an ordered stem and leaf diagram for these points.



(3)

(b) Find the median.

..... points
(2)

(c) Work out the range.

..... points
(2)

The Durham Dribblers are also a basketball team.
They have a median score of 96 points and a range of 18 points.

(d) Compare the distributions of points scored by the Bolton Boys and the Durham Dribblers.

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(2)

The Bolton Boys and Durham Dribblers each have a basketball game next week.

(e) Discuss which team is likely to score most points in their game.

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(2)

The scores for Vitality Roses netball team for the 2017 season are listed below.

55 61 72 62 52 74 56 49 75 66
64 85 55 52 55 94 61 46 74 54

(Source: www.Englandnetball.co.uk)

(a) Use the data to complete the back-to-back stem and leaf diagram.

2017 season		2018 season
	1	9
	2	5 6 9
	3	5 7 9
	4	3 3 5 5 5 7
	5	0 2 2 4 6 8 8
	6	4 5 6
	7	0 2
	8	
	9	0

Key:

(3)

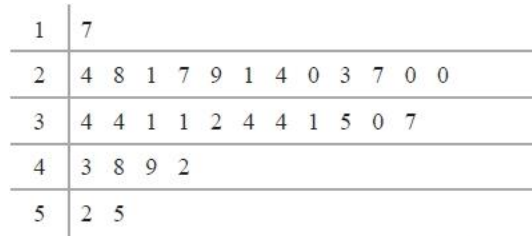
(b) Work out the interquartile range of the scores for the 2018 season.

.....

(2)

Randall used the internet to find the number of points scored by each of the winning teams in the last 30 years of the American Super Bowl.

He drew this stem and leaf diagram for his data.



(Source: nfl.com)

(a) Write down two improvements Randall should make to the stem and leaf diagram.

1

.....

2

.....

(2)

(b) Assess the reliability of using the internet as the source of Randall's data.

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(1)

Randall believes that the number of points scored by the winning team is increasing over time.

(b) Comment on whether or not Randall has represented his data in an appropriate diagram in order to support his belief.

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(1)

The back-to-back stem and leaf diagram gives information about the ages of a random sample of members of parliament in Canada and in the UK.

Canada		UK
7 3 2 2	3	5 7
8 6 4 4 4 3	4	0 0 1 3 3 6 8 8
7 5 4 4 3 1 0	5	2 3 4 5 6 7
9 5 1 1 1	6	0 2 2 2 3 8 9
4 3 1	7	7 9

Key:
 2|3|5 represents an age of 32 for a member of parliament in Canada and an age of 35 for a member of parliament in the UK

(Source: en.wikipedia.org)

- (a) Give a reason to support the use of a back-to-back stem and leaf diagram to represent this information.

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(1)

Some information about the quartiles of these two distributions is given in the table below.

	Canada	UK
lower quartile	44	<i>b</i>
median	<i>a</i>	54
upper quartile	61	<i>c</i>

- (b) Find the value of *a*, the value of *b* and the value of *c*

a =

b =

c =

(3)

(c) Write down the proportion of members of parliament in the UK that are likely to be older than 54 years old.

Give a reason for your answer.

.....
.....

(1)

(d) Compare the spread of ages for members of parliament in Canada with the spread of ages for members of parliament in the UK.

State clearly the values of the statistic you use to make your comparison.
Interpret your comparison.

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(3)

One member of parliament in the UK wants to investigate the ages of the people living in her constituency.

She suggests using the electoral register as a sample frame for her investigation.

(e) State one use of a sample frame in an investigation.

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.....

(1)

(f) Assess the suitability of using the electoral register as a sample frame for this investigation.

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(2)

A large number of runners took part in a 5 km race.

Here are the results of some of the runners.

Runner	Race time
A	16 minutes 24 seconds
B	22:31
C	17.34
D	21:03
E	19.2 minutes
F	30,57
G	24:45

(Source: Parkrun)

Maya wants to represent the results of all of the runners using a stem and leaf diagram.

(a) Discuss two things Maya must do to the data to be able to represent it in a stem and leaf diagram.

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(2)

(b) Explain whether or not it would be appropriate to represent the results of all of the runners in the race using

(i) a scatter diagram,

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(ii) a histogram,

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(iii) a time series graph.

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(3)

Some people were asked to complete three puzzles, Puzzle X, Puzzle Y and Puzzle Z.

The table shows some summary statistics about the times taken, in minutes, to complete Puzzle X and Puzzle Y.

Puzzle	Median time (minutes)	Range of times (minutes)
X	30	10
Y	25	40

The shortest time taken to complete Puzzle X was 26 minutes.

(a) Work out the longest time taken to complete Puzzle X.

..... minutes
(1)

(b) Use the information in the table to compare the median time to complete Puzzle X with the median time to complete Puzzle Y.
You should interpret your comparison.

.....
.....
.....

(2)

The list below gives the times taken, in minutes, for these people to complete Puzzle Z.

- 25 27 31 39 32 32 37 34
38 31 46 45 47 42 41

(c) Work out the range of these times.

..... minutes
(1)

(d) Which puzzle, X, Y or Z, is completed with the most consistent times by these people?

Explain your answer.

Puzzle

because.....

.....

(1)

Hannah wants to find the median of the 15 times taken, in minutes, to complete Puzzle Z.

She draws this stem and leaf diagram for these 15 times.



She says that as there are 15 values, the median is the 8th value, which is 34 minutes.

(e) Explain what Hannah has done wrong.

You should give the correct value of the median.

.....
.....
.....

(2)

Supul is investigating how long pupils in Year 10 in his school spent on homework.

He asked each pupil to record the time taken, to the nearest minute, to do their homework one night.

*(a) Describe the type of data the pupils recorded.

.....

.....

(2)

Supul collected each pupil's recorded time.

*(b) Discuss how reliable the data might be.

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.....

(2)

Supul selected a sample of 20 of the pupils.
Here are their recorded times.

55	53	35	31	21	47	64	53	23	37
50	32	58	51	40	45	63	33	41	60

(c) Complete an ordered stem and leaf diagram for these times.

You must include a key.

(3)

(d) Find the median time.

..... minutes

(1)

The mean time is 44.6 minutes.

(e) How many of the 20 pupils took more than the mean time to do their homework?

.....

(1)

The times were recorded to the nearest minute.

(f) Find the **maximum** possible range for the times.

..... minutes

(2)

Ruth is investigating the results of the Six Nations rugby competition.

She finds the following summary information for the Six Nations rugby competition in 2018 and in 2019

2018

Final position	Team	Matches won	Matches drawn	Matches lost	Points scored for	Points scored against
1	Ireland	5	0	0	160	82
2	Wales	3	0	2	119	83
3	Scotland	3	0	2	101	128
4	France	2	0	3	108	94
5	England	2	0	3	102	92
6	Italy	0	0	5	92	203

2019

Final position	Team	Matches won	Matches drawn	Matches lost	Points scored for	Points scored against
1	Wales	5	0	0	114	65
2	England	3	1	1	184	101
3	Ireland	3	0	2	101	100
4	France	2	0	3	93	118
5	Scotland	1	1	3	105	125
6	Italy	0	0	5	79	167

(Source: www.sixnationsrugby.com)

(a) In 2018, which two teams had fewer 'points scored for' than 'points scored against'?

..... and
(1)

Two teams finished in the same final position in 2019 as they had finished in 2018

(b) Write down the names of these two teams.

..... and
(1)

(c) Which team won 2 matches in 2018 and 3 matches in 2019?

.....
(1)

Ruth concludes that in 2018 and in 2019 Wales had a more successful rugby team than Scotland.

(d) Does the information in the tables support her conclusion?

Give a reason for your answer.

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.....
.....

(2)

Ruth found from a newspaper the age of each player from the England team for a 2019 Six Nations rugby match.

Here are the ages.

20	24	25	25	26	26	26	27
27	28	28	28	28	29	29	

(Source: www.irishtimes.com)

(e) Find the mode of the ages.

.....
(1)

Ruth plans to use a stem and leaf diagram to represent the ages.

(f) Discuss whether or not a stem and leaf diagram would be an appropriate diagram to use.

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(2)