Set A: Review Materials – Junior Certificate Strand 1 and Strand 2

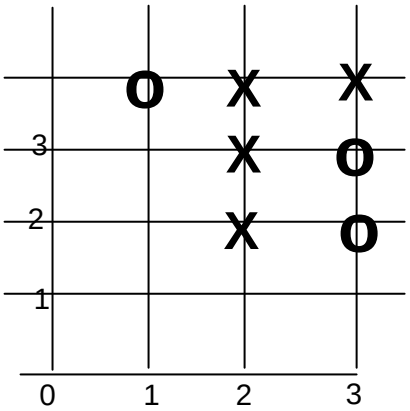
Before you attempt these questions have a look at the "understanding statistics" document.

This set of questions, compiled in two documents, is intended to help you review your work as you prepare for Paper 2 in the Junior Certificate examination. The questions are not intended to be exact matches of what will come up in the exam but they should give you a flavour of how the concepts can be examined in context. Other questions and activities can be found in the Mathematics Resources for Students on the student zone at www.ncca.ie/projectmaths

JCFL

Melissa and Sean are playing a game

Melissa has to make a line of 4 **X** to win.



Put an **X** on the grid to make a winning line for Melissa

Write the co-ordinates of each **X** in this winning line.

(….. , …..) (….. , …..) (….. , …..) (….. , …..)

Look at the numbers in the co-ordinates of these points.

What do you notice?

Is the point (1, 6) on Melissa's winning line?

How do you know?

Where can you put the X so that there are 4 in a row?

Try out different places ….you may extend the grid if you like. Now decide where you would put the X so that there are 4 in a row.

Now try to remember how to label points on a co-ordinate grid. How far did you go out along the x axis? This is the x-coordinate.

How far did you go up or down along the y axis? This is the y-coordinate.

Can you see a pattern between the x and y coordinates?

It might help if you were to put them in a table

x-coordinate	y-coordinate

Now think about the point (1, 6) is this on the winning line? How would you know?

One way to find out is to put the point (1, 6) in your table and see does it fit with the pattern you saw before.

If it doesn't fit with the pattern you saw why do you think this is? Try to explain.

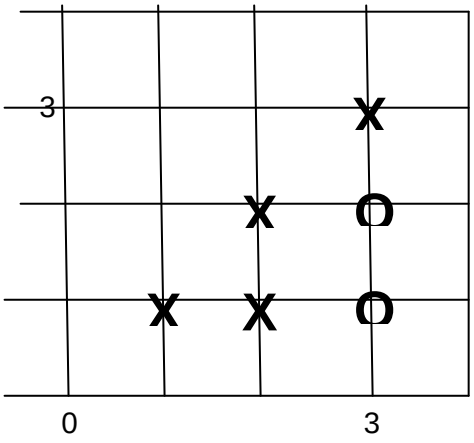
Can you think of another way to make a decision about whether or

JCOL

Melissa and Sean are playing a game

Melissa has to make a line of 4 **X** to win

Put an **X** on the grid to make a winning line for Melissa.



Write the co-ordinates of the four **X** in this winning line.

(….. , …..) (….. , …..) (….. , …..) (….. , …..)

Look at the numbers in the co-ordinates of these points. What do you notice?

Is the point (6, 7) on Melissa's winning line?

How do you know?

What is the relationship between the x and y coordinates of all points on Melissa's winning line?

Where can you put the X so that there are 4 in a row? What is different about this question and the FL question above?

Try out different places ….you may extend the grid if you like. Now, where would you put the X so that there are 4 in a row?

Now try to remember how to label points on a co-ordinate grid. How far did you go out along the x axis? This is the x-coordinate.

How far did you go up or down along the y axis? This is the y-coordinate.

Can you see a pattern between the x and y coordinates?

It might help if you were to put them in a table

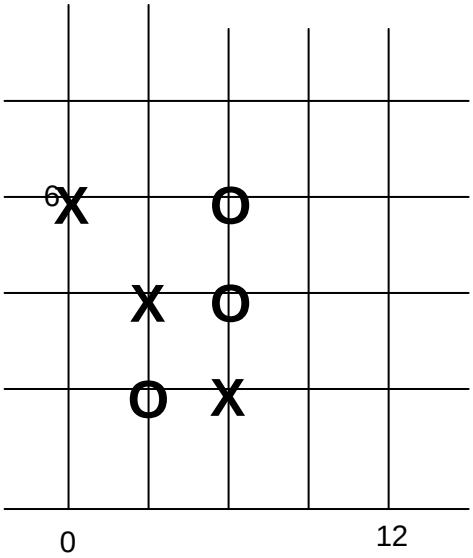
x-coordinate	y-coordinate

Now think about the point (6,7); is this on the winning line? How would you know?

One way to find out is to put the point (6,7) in your table and see does it fit with the pattern you saw before.

If it doesn't fit with the pattern you saw why do you think this is? Try to explain

JCHL



Melissa and Sean are playing a game

Melissa has to make a line of 4 **X** to win.

Put an **X** on the grid to make a winning line for Melissa

Write the co-ordinates of the four **X** in this winning line.

(….. , …..) (….. , …..) (….. , …..) (….. , …..)

What is the relationship between the x and y coordinates of all points on Melissa's winning line?

If the x coordinate of a point on this line is 25 what should the Y coordinate be?

Explain how you arrived at your answer.

Scaling the axes is a challenge in this question, look at the axes and see why this is the case. What is different about this question and the FL and OL questions above?

Can you see a pattern between the x and y coordinates?

It might help if you were to put them in a table

x-coordinate	y-coordinate

Now think about other points on this winning line; they should fit with this pattern. Try to generalise the pattern you see; this will give you the equation of the line. Can you find the equation of the line in any other way?

Compare the two methods.

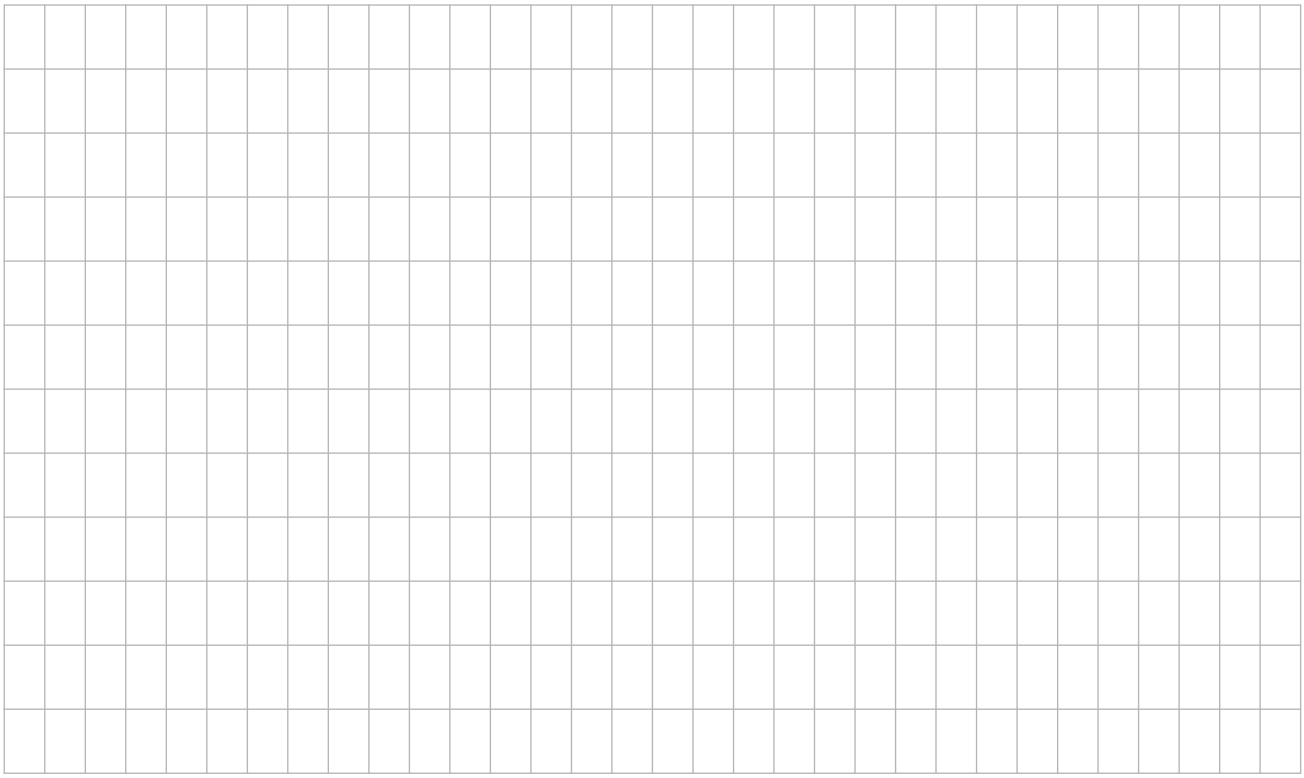
Remember the equation of a line is just the generalisation of the pattern that exists between the x and y coordinates of the points on a line. Once you know this generalised pattern you can find any points on the line and make predictions about the line.

Q. 2 JCHL

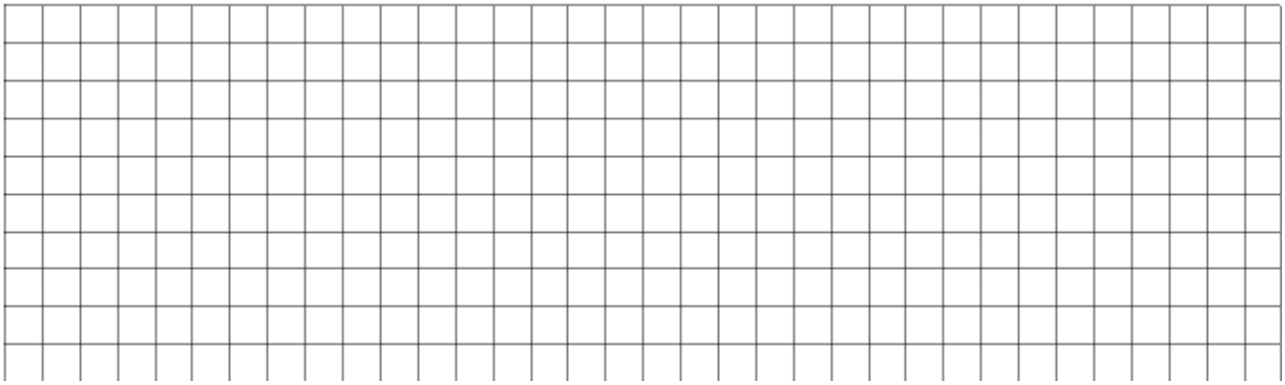
Joe and Sophie were investigating the relationship between the current flowing through a wire and the voltage across the wire. They performed an experiment and recorded their results in the table.

Voltage (Volts)	Current (Amps)
2	0.2
3	0.3
4	0.4
5	0.5
6	0.6

Plot their results on a coordinate grid.



What is the relationship between the x and y coordinates? Generalise this relationship and write it in the form of an algebraic formula.



If the voltage across the wire was 10 volts, what do you think the current flowing through the wire would be? Explain your thinking.

When you plot your points on the grid decide what type of a relationship exists between the current flowing through the wire and the voltage across it. Is it a linear relationship? How would you know? Is it a quadratic relationship? How would you know? Is it an exponential relationship? How would you know?

Click on the *concept of slope* presentation for help with this question.

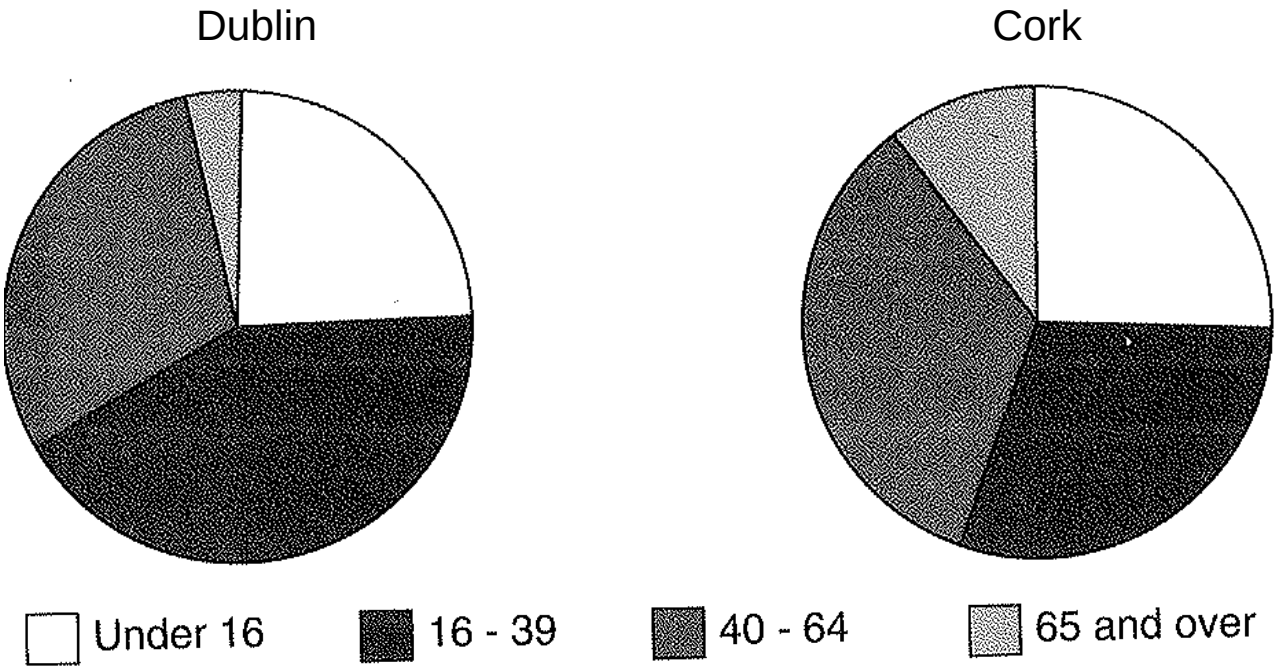
When you have decided on the type of relationship that exists between the current flowing through a wire and the voltage across it you can generalise this relationship; again the *concept of slope* presentation should help you with this.

Once you have generalised the relationship or know the equation you can answer lots of questions about the relationship between other points that lie on the line.

Q. 3 JCHL

These pie charts show information from a survey of people's ages.

400 people in Dublin and 800 people in Cork were surveyed.



John looked at the charts and said

"There is roughly the same number of people under 16 in Cork as there is in Dublin"

Looking at the charts, why do you think John said this?

Do you agree with John? Give a reason why you do or do not agree with him.

Display the data in a way that will make it easier for John to compare the two surveys.

Explain why you made this choice.

This question was designed to promote discussion about pie charts and the information that they can give you. When you discuss things with your friends it gives you an opportunity to get a good idea about what they are thinking in their heads. Sometimes you are all thinking the same thing; sometimes when you hear what others think it makes you think again about your own ideas .You might say “Gosh I never thought about it like that” or “I never really knew that”; when this happens you are able to **refine** your ideas to take into consideration those of your friends. At other times you might disagree and think “No that is not what this is about” and you will **defend** your ideas to your friends. Both of these types of reactions, **reflection/refinement** and **defending,** are a very important part of the learning experience. When your teacher engages in discussion with you he/she gets an idea of what is in your head and he/ she will be able to help you change/refine or extend your thinking. That is why you will find you are doing a lot more discussing these days in Maths class.

Now back to this question. Do you agree with John? Exactly what information is contained in the sections of a pie chart? Does it contain exact amounts? or proportions? If it contains exact amounts, then is John right? If it contains proportions then is John right? Can you see why John may or may not be right? Is the fact that 400 people were surveyed in Dublin and 800 surveyed in Cork significant? If so, how?

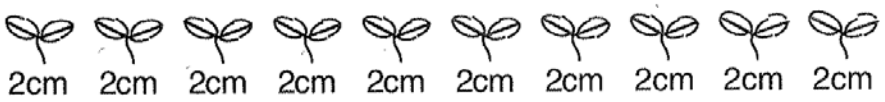
Q. 4 JCHL

An advert says

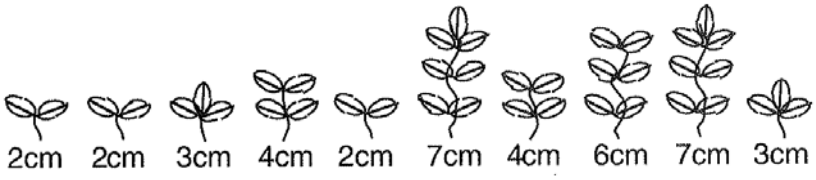
Wondergrow doubles the height of your plants in 2 weeks

Susie uses Wondergrow on her plants.

Day 1 (at the start)



2 weeks later



a) Does Wondergrow really double the height of the plants?

Use the **mean** and **range** to explain your answer.

b) If Susie chose one of her plants at random what is the probability that it would have doubled in height after 2 weeks?

c) Circle the statement which you think is most accurate. Use Susie's data to explain your choice.

i. It is **impossible** that your plants will double in height after 2 weeks if you use Wondergrow.

ii. It is **unlikely** that your plants will double in height after 2 weeks if you use Wondergrow.

iii. It is **likely** that your plants will double in height after 2 weeks if you use Wondergrow.

iv. It is **certain** your plants will double in height after 2 weeks if you use Wondergrow.

This question encourages you to think about statistical claims and to use evidence from data to agree with or disagree with a claim.

Take a first look at the data; what are you first instincts? Does wondergrow double the height of any of the plants? All of the plants? Some of the plants?

What does the **mean** height tell you? Calculate the **mean** height before and after the treatment with wondergrow. What has wondergrow done to the **mean** height of the plants?

What about the **range** of heights? What was the **range** of heights before the treatment with wondergrow? and after?

What does the **range** tell you about the heights of the plants?

Looking at the data; how likely is it that if you use wondergrow it will double the height of your plants after 2 weeks?

Certain? Why? Why not?

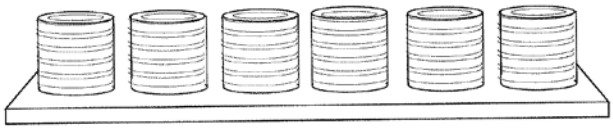
Impossible? Why? Why not?

Likely? Why? Why not?

Unlikely? Why? Why not?

Q. 5 JCFL

Kai has 6 tins of paint but the labels have come off.



He knows that he had

White, Magnolia, Yellow, Rose, Midnight Sun, and **Cream**

Kai picks a tin.

He thinks that the probability that he will pick **magnolia** is 1/6.

Kai is **right.**

Explain why.

Yetunde knows that students in his school liked to watch these sports:

Soccer Gaelic Football Rugby

He says:

"*The probability that the next person I meet likes to watch Rugby is 1/3, because there are three sports*"

Do you agree with Yetunde? Explain why.

Think! How many cans of Magnolia paint are there?

How many cans of paint are there altogether?

Can you see now why Kai is right when he says the probability of choosing a can of magnolia paint is 1/6?

Think about your school; if you wanted to know the probability of a student liking soccer, rugby or Gaelic football how would you go about finding out?

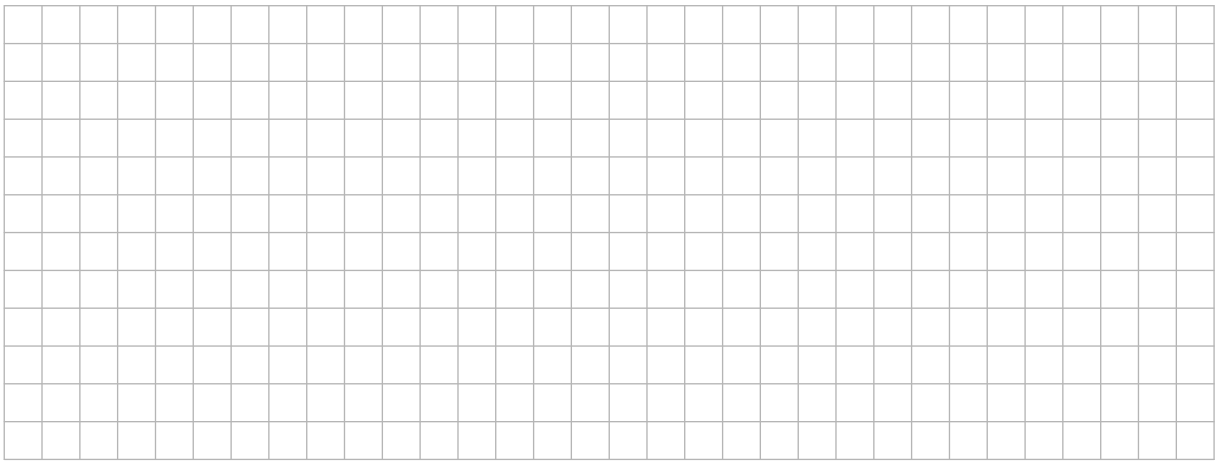
Would you have to survey the students? Or would you agree with Yetunde there is no need to survey the students because there are three sports so the probability of someone liking soccer must be 1/3?

Q. 6 JCHL

During May 2010, 110 cars were taken to a car testing station.

The results showed that 36 had defective brakes and lights, 42 had defective brakes, and 47 had defective lights. A car will not pass the test if it has one or more of these defects.

Display the information in a Venn diagram.



What is the probability that a car chosen at random

a) Failed the test

b) Passed the test

c) Had exactly one defect.

Q. 7 JCOL

Sarah, Jo, Alan and Amy want to find out what people think and do about child labour.

They are preparing a questionnaire.

Here are some questions they suggest:

Sarah: Are you a member of a human rights organisation? Yes/No

Jo: Are children important? Yes/No

Alan: Don't you agree that making young people work is very, very cruel? Yes/No

Amy: Do you buy products from shops that sell goods manufactured by children? Yes/No

Choose two of these questions that **you** think ***should not be used***. Whose questions are they?

Explain why you think these two questions should not be used

Write an extra question that **you** would use. People should be able to answer the question with ‘Yes’ or ‘No’.

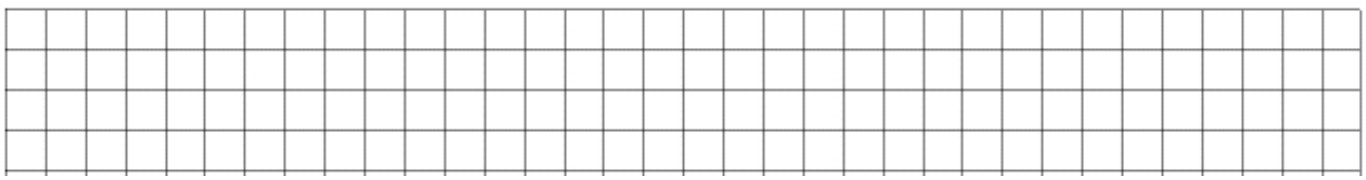
Q. 8 JCOL

A librarian asks you to do a survey of the people using the library. She does not want you to talk to any of the members.

She chooses these five headings:
Time of day, Sex, Age, What was borrowed, Reason for borrowing the item
She gives you this record sheet:

Time of day	Sex	Age		What was borrowed				Reason for borrowing the item
	M/F	Under 40	40 or over	CD	DVD	Novel	Ref Book	

It is easy to use the heading "**Sex**" because it is usually easy to see if a person is male or female.
Pick one heading which is harder to use for collecting information.



Explain why it is harder to use

For the rest of this question you will need to think about surveys which **you** have done.

Think back to a sheet which **you** have used to collect information.

What were you collecting information about?

Write down one heading you used. It can not be the same as any of the librarian's headings.

Was the heading easy to use for collecting information?

Explain why.

Think about designing questionnaires. It is likely that you have done a statistical investigation in class and may have had to ask people questions in order to get information or data. **Bias** is something you should always consider when you are asking people questions. The way you ask the question can influence the answers that people give, this is known as bias. If you ask a biased question your data is **unreliable** and you can't really be sure that is what the person who answered really thinks.

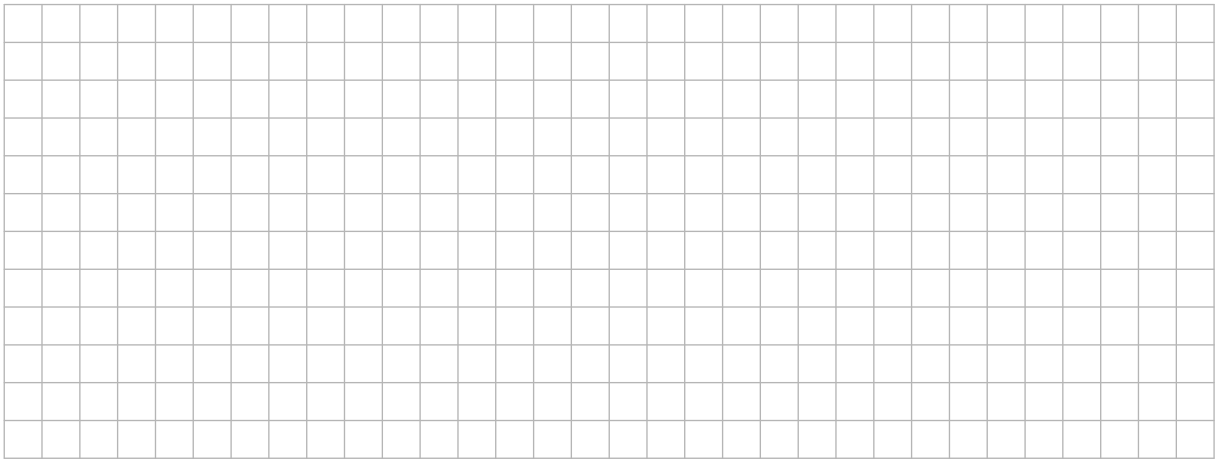
Q. 9 JCFL

The youth club is planning a trip

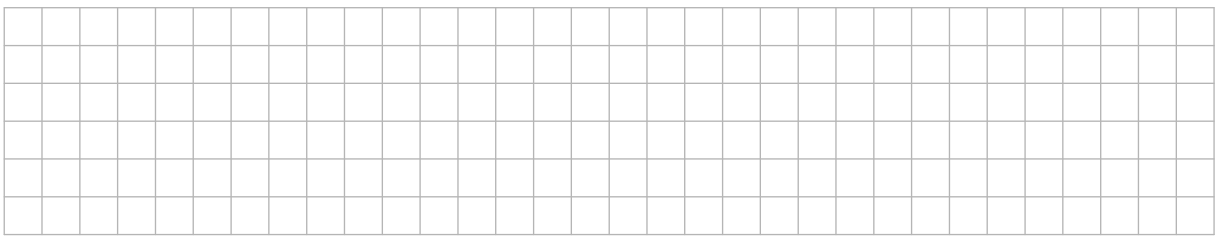
This is what each person chooses

Cinema	Sarah, Amy, Mags, John, Eamonn, Sean, Padraig, Mary, Steven, Anne, Erica, Paul
Bowling	Ross, Charlie, Roy Bernie, Amanda, Adrian, Hannah, Erin
Quasar	Brendan, Pete, Lauren, Gavin, Paul, Ciaran

Display this data in a way that will allow you to answer the questions below.

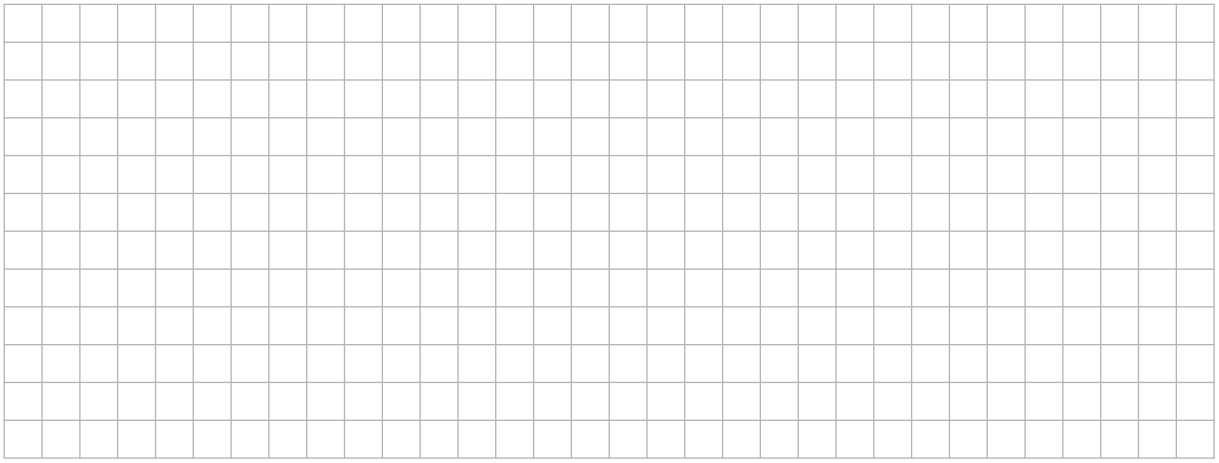


Where do most people want to go?



The Youth leader decides to ask everyone to write their choice on a piece of card and places these in a hat.

The Youth leader pulls 1 piece of card from the hat. This is where they will all go. What is the probability that Adrian will get his choice?



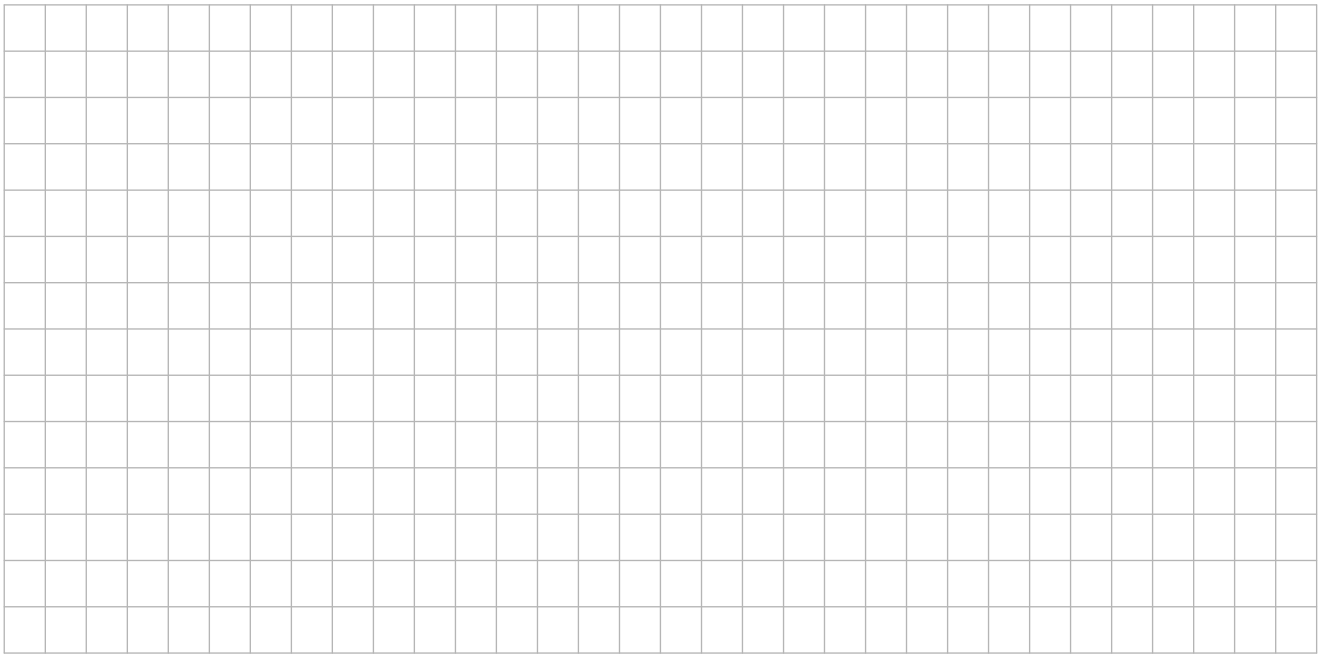
Q. 10 JCHL

Rosin and Peter wanted to see which of the two restaurants in town gives the best value for money.

They decided to visit each restaurant over a two week period, order a meal and record the number of chips on their plates. The results are recorded below

Lucy's Lunches	Number of chips on the plate													
	33	34	34	35	34	32	34	33	36	30	32	33	34	35
Dave's Diner	39	26	25	42	35	47	42	39	24	30	37	42	26	25

Display the results in a way that will allow you to compare the two sets of data.



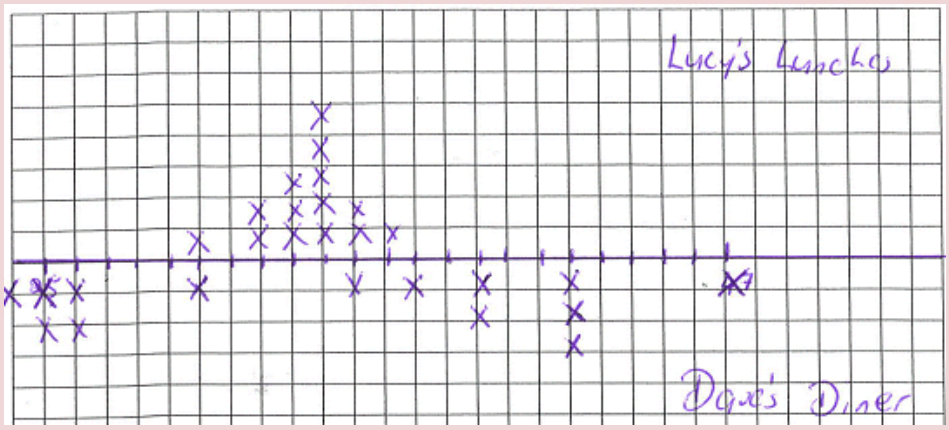
Help Rosin and Peter use their data to decide which restaurant gives the better value for money.

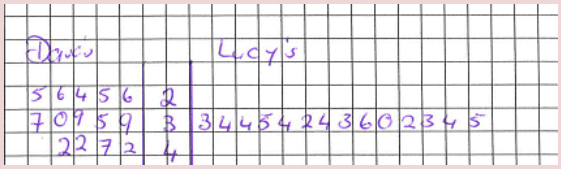
How would **you** investigate which restaurant gives the best value for money?

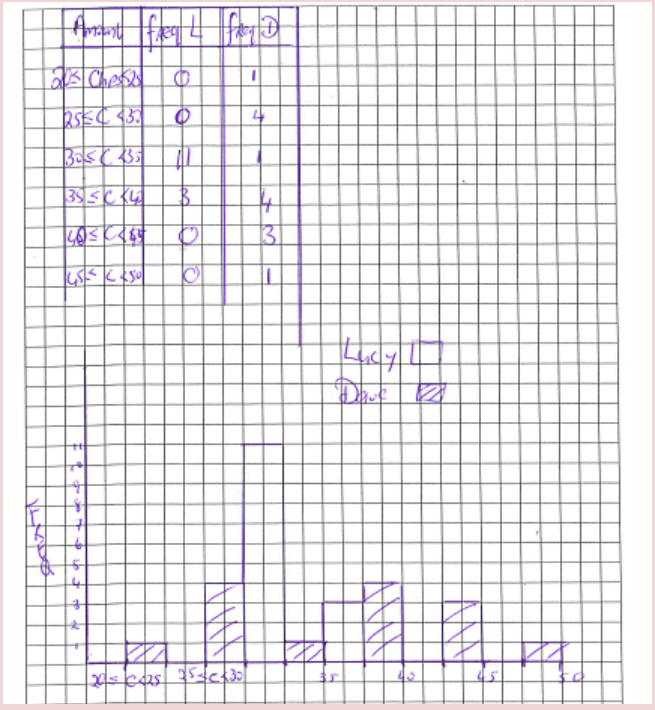
Once you have gathered the data remember you need to display it in a way that allows you to see patterns in the variation.

Think about the different displays you have used throughout the JC course. Think about what makes each of these displays useful.

Look at the displays below that other students made of the data. Which do you think is most useful and why? How would you display this data?







Q. 11 JCHL

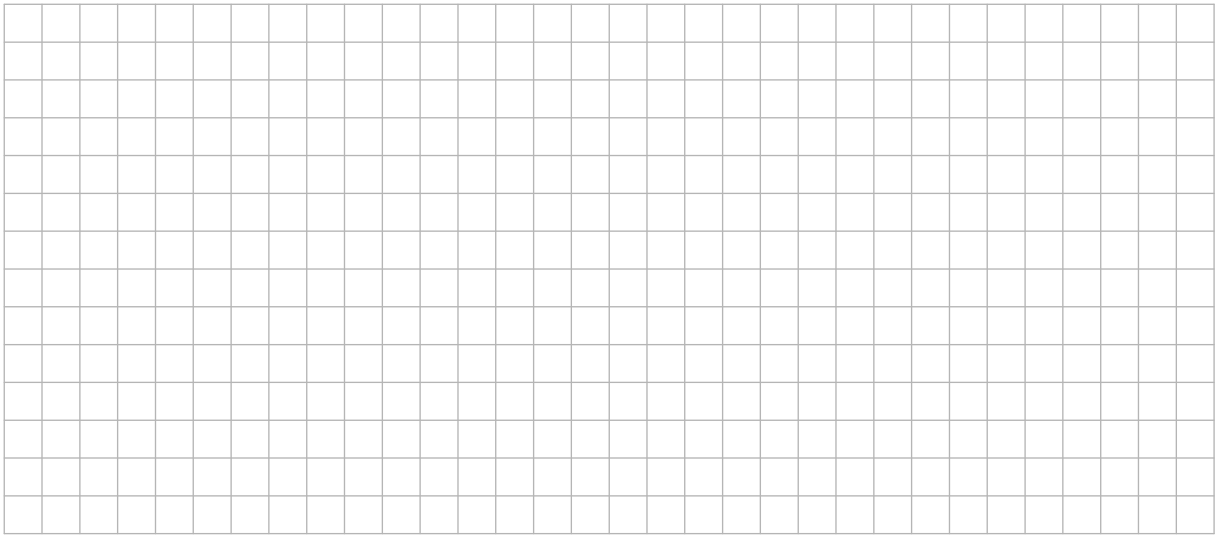
A group of students was investigating the weight of coins.

They weighed a **sample** of 48 *two-cent coins* and recorded the weights to the nearest .01g in the table.

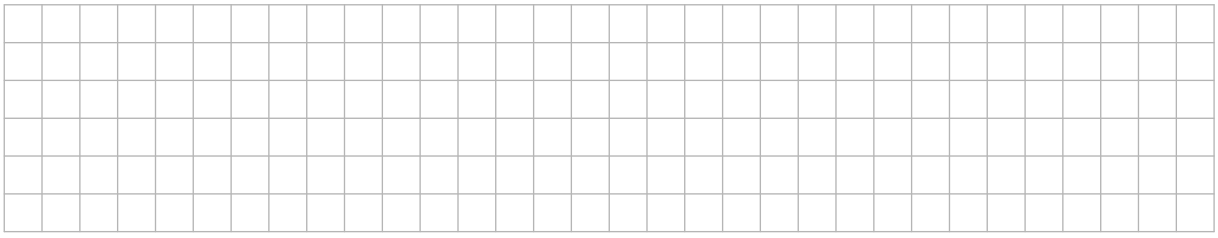
Weight of a two-cent coin (g)							
3.08	2.95	3.10	2.97	3.02	3.10	2.84	3.00
3.10	3.12	3.03	2.85	3.09	3.05	3.15	3.09
3.06	3.05	3.11	3.07	3.02	3.05	3.06	3.18
3.05	3.14	4.52	3.43	3.00	3.09	3.07	2.94
3.05	3.15	3.15	3.00	3.04	3.07	3.06	3.17
3.13	3.05	3.11	3.12	3.03	3.09	3.00	3.01

a) None of the 48 coins weighs the same. What do you think may be a cause of this variation?

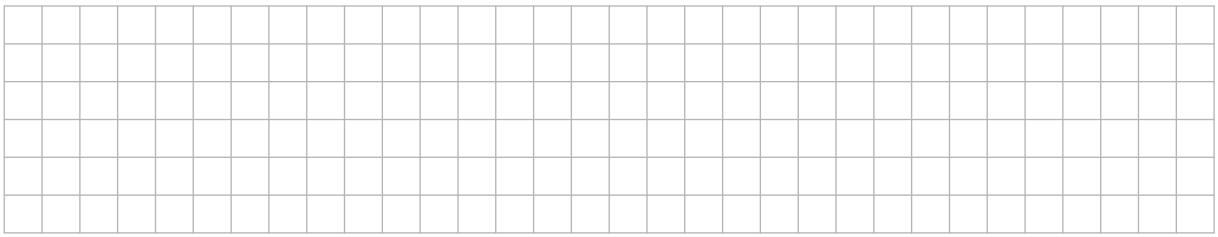
b) Display the data in a way that will allow you to describe it. What do you think is a typical weight for a two-cent coin? Explain your reasoning.



c) Based on the data in the table what do you think the weight of a 49th two-cent coin will be? Are you more confident to give an actual value or a range of values? Explain your thinking.



d) Are there any unexpected values in this data set? How do you know?



Q. 12 JCOL

Sarah, Ellie and Samir were measuring the length of the science lab. Sarah used a **metre stick**. Ellie and Samir used a **measuring tape**.

Each group of students measured the length of the lab 6 times and recorded the measurements to the nearest cm in a table

Well each time I worked out how many paces it took for me to walk down the lab. Then I measured the length of a pace with the metre stick and multiplied that by the number of paces and wrote it in the table.

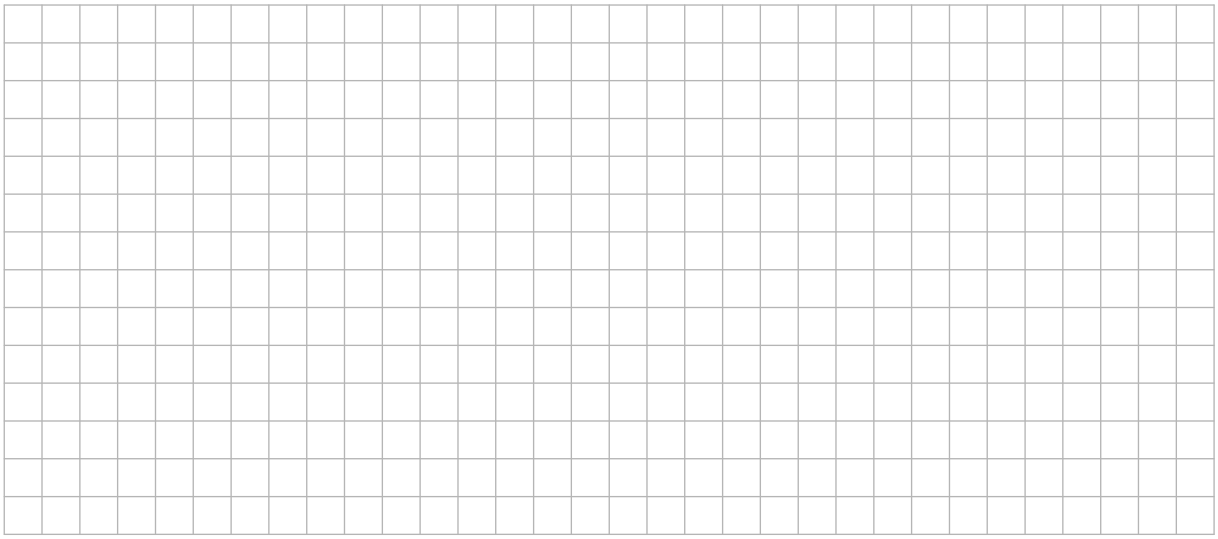
Samir and I worked together. He held the tape against the wall and I walked to the opposite wall and read the measurements. Then we changed, I stayed at the wall and Samir walked down and took the reading; we measured it 6 times.

Measuring Instrument	Length of lab (cm)					
Metre stick	850	870	910	880	915	885
Measuring tape	889	888	889	889	888	888

a) Why do you think there are differences in the measurements in the table?

b) Which method gave a more accurate measurement of the length of the science lab? Explain why you think this is the case.

c) If you were asked to state the length of that science lab, what answer would you give? Explain why.



Q. 13 JCOL

Esperanza was investigating family sizes.

She wanted to find out what was a typical family size for people in her class

She asked four classmates:

How many people in your family?

1

Just me and Mum

Sarah

11

Amy

Well my Dad lives with Mary and her 3 children…..that's 5
Karl and I live with Mum, Joe and his daughter Sue..that's another 5….. Oh and Jake the dog.

Mum, Dad Sam and I

8

Paul

Nana and granddad Jones, My other nana, Mum, Dad, me and Jess…Oh and uncle Sean sometimes

4

Ellie

Esperanza's data is not **reliable**? Explain why

If you wanted to find out the typical family size of people in **your** class what would **you** do to make sure the data you gathered was **reliable**?

Below is such data gathered by a group of 3rd Year students.

3,3,3,4,4,4,4,4,5,5,5,6,7,10,4,2,2,5,5,8,4,3,3,3,4,4,4,3,3,3

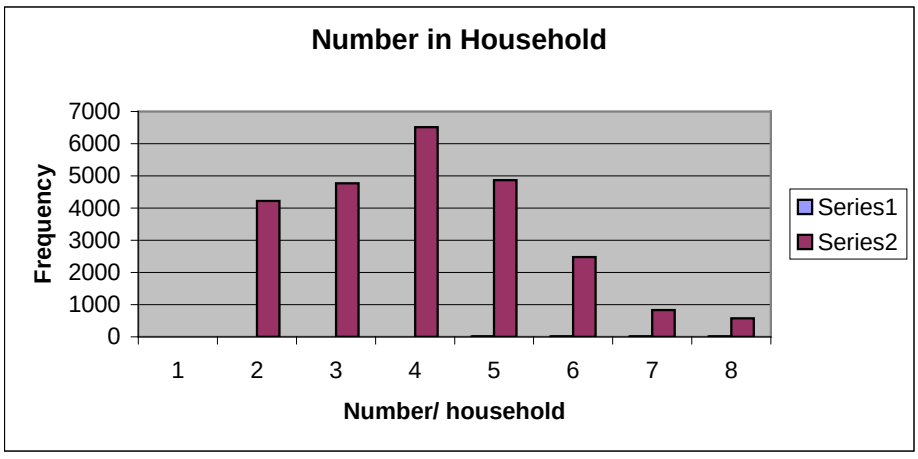
Display this data in a way that allows you to see a pattern in the data.

What would you say is the typical family size for students from this 3rd year group?

Justify your answer with evidence from the data.

The diagram shows the distribution of household sizes from households in the Carlow area.

Household size	Frequency
2	4218
3	4773
4	6512
5	4870
6	2478
7	833
8	572



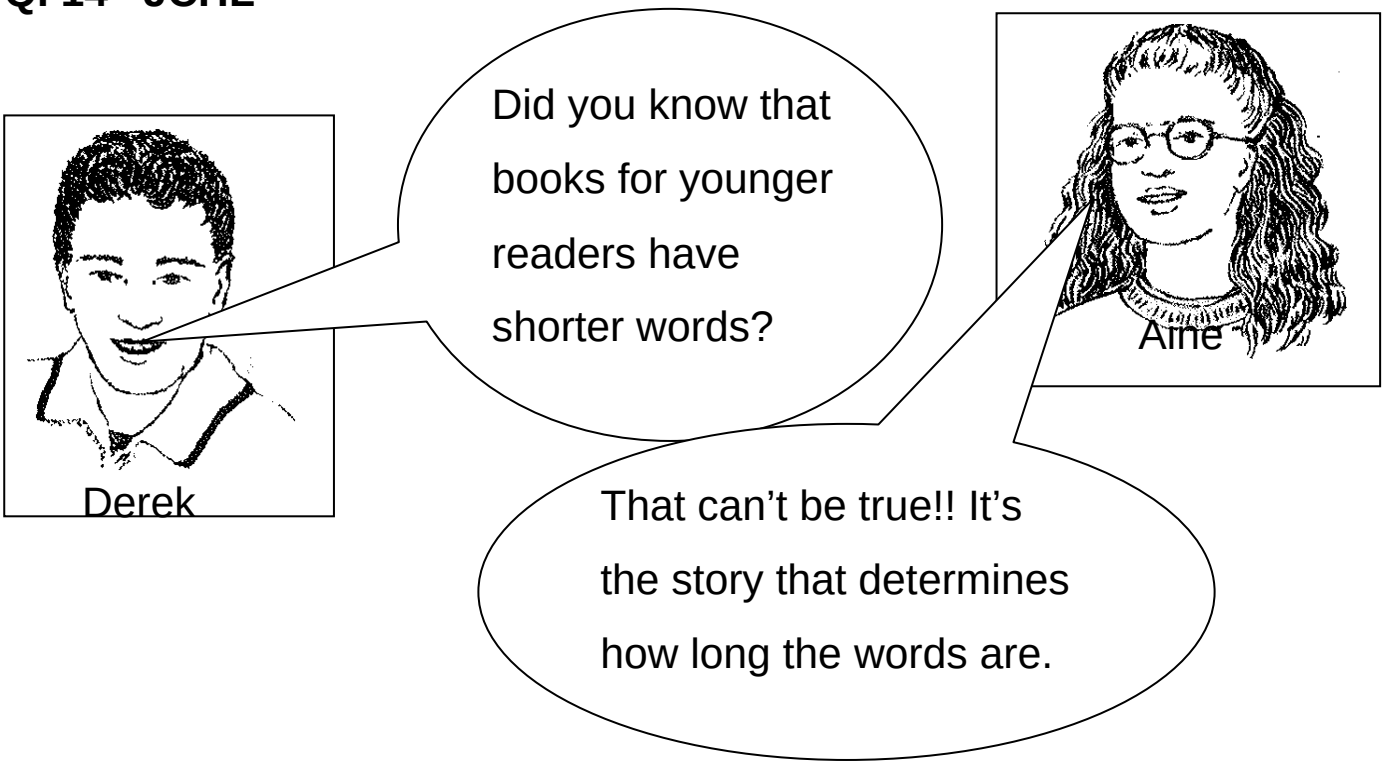
Compare the set of data from Carlow with the 3rd year set.

How likely is it that the 3rd year group surveyed all live in Carlow?

Justify your answer with evidence from the data.

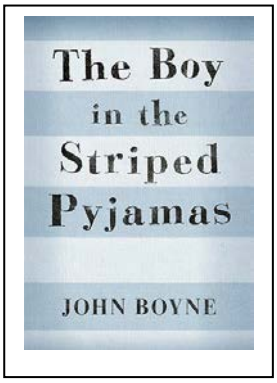
I think it is (impossible, unlikely, likely, certain) that the 3rd year group lived in Carlow because

Q. 14 JCHL



Use the following extracts from ***Charlie and the chocolate factory*** and ***The boy in the striped pyjamas*** to see if there is any evidence that the words in ***The boy in the striped pyjamas*** are longer than the words in the ***Charlie and the chocolate factory.***

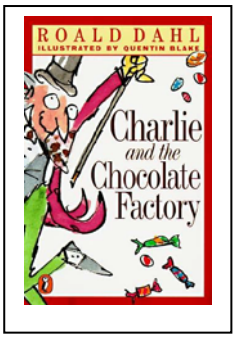
Extract 1



The boy in the striped pyjamas

…One afternoon, when Bruno came home from school, he was surprised to find Maria, the family's maid — who always kept her head bowed and never looked up from the carpet — standing in his bedroom, pulling all his belongings out of the wardrobe and packing them in four large wooden crates, even the things he'd hidden at the back that belonged to him and were nobody else's business. ….

Extract 2



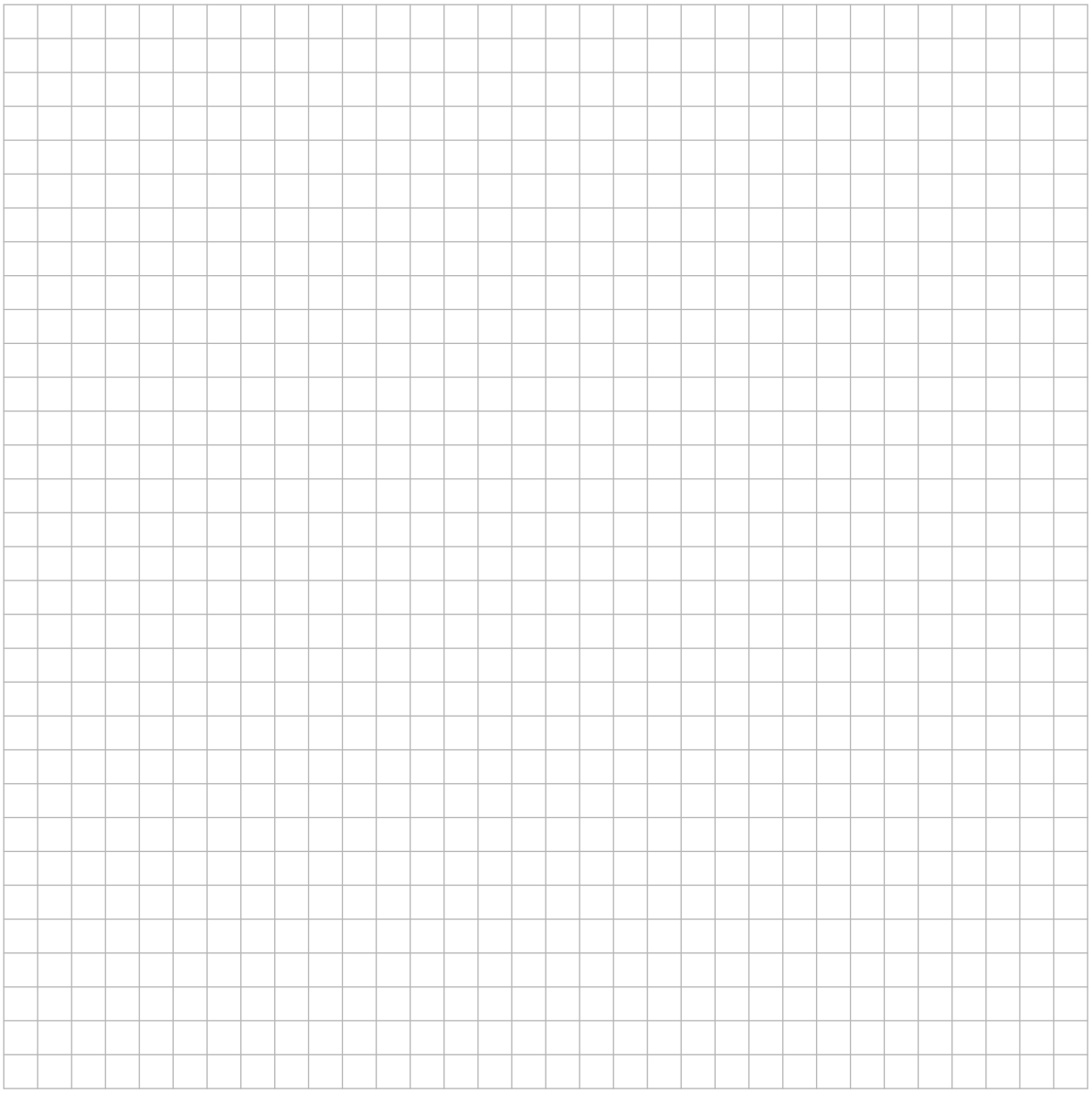
Charlie and the chocolate factory

….. he did. He told all the workers that he was sorry, but they would have to go home. Then, he shut the main gates and fastened them with a chain. And suddenly, Wonka's giant chocolate factory became silent and deserted. The chimneys stopped smoking, the machines stopped whirring and from then on, not a single chocolate or sweet was made. Not a soul went in or out…..

What would **you** do differently if you were going to look for evidence to support Derek's theory?

Think about

- how you would select your sample of words from both books
- the size of your sample.



How does the display help you decide on the *typical* value?

Do the different contexts make it easier or more difficult to state the *typical* value?

How do the *mean*, *mode*, *median* and *range* relate to the *typical* value?

Q. 15 JCFL

Samil drops a tray with these objects on it.

They fall on a wooden floor

How likely are they to break?

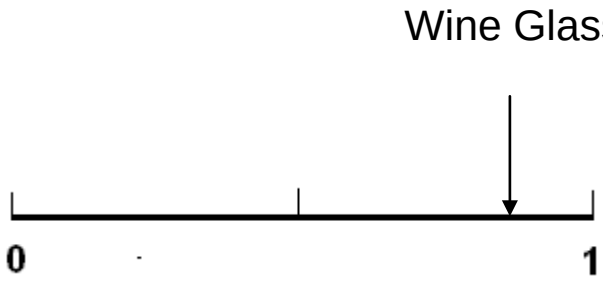
Put them all in order

Most Likely ……

……

……

Least likely ……



The arrow on the number line shows the probability of the wine glass breaking

Explain why this is a sensible place to put the arrow.

Put more arrows on the line to show the probability of the other objects breaking.

Think about the probability of the calculator breaking.

Roughly how far along the line did you put its arrow?

Write this as a **decimal,** a **percentage** or a **fraction**.

Q. 16 LCOL

8 out of every 10 men in Ireland are colour blind.

What is the probability that a man in Ireland picked at random is not colour blind?

Two men in Ireland are picked at random. What is the probability that

a) they are both colour blind?

b) at least one is colour blind?

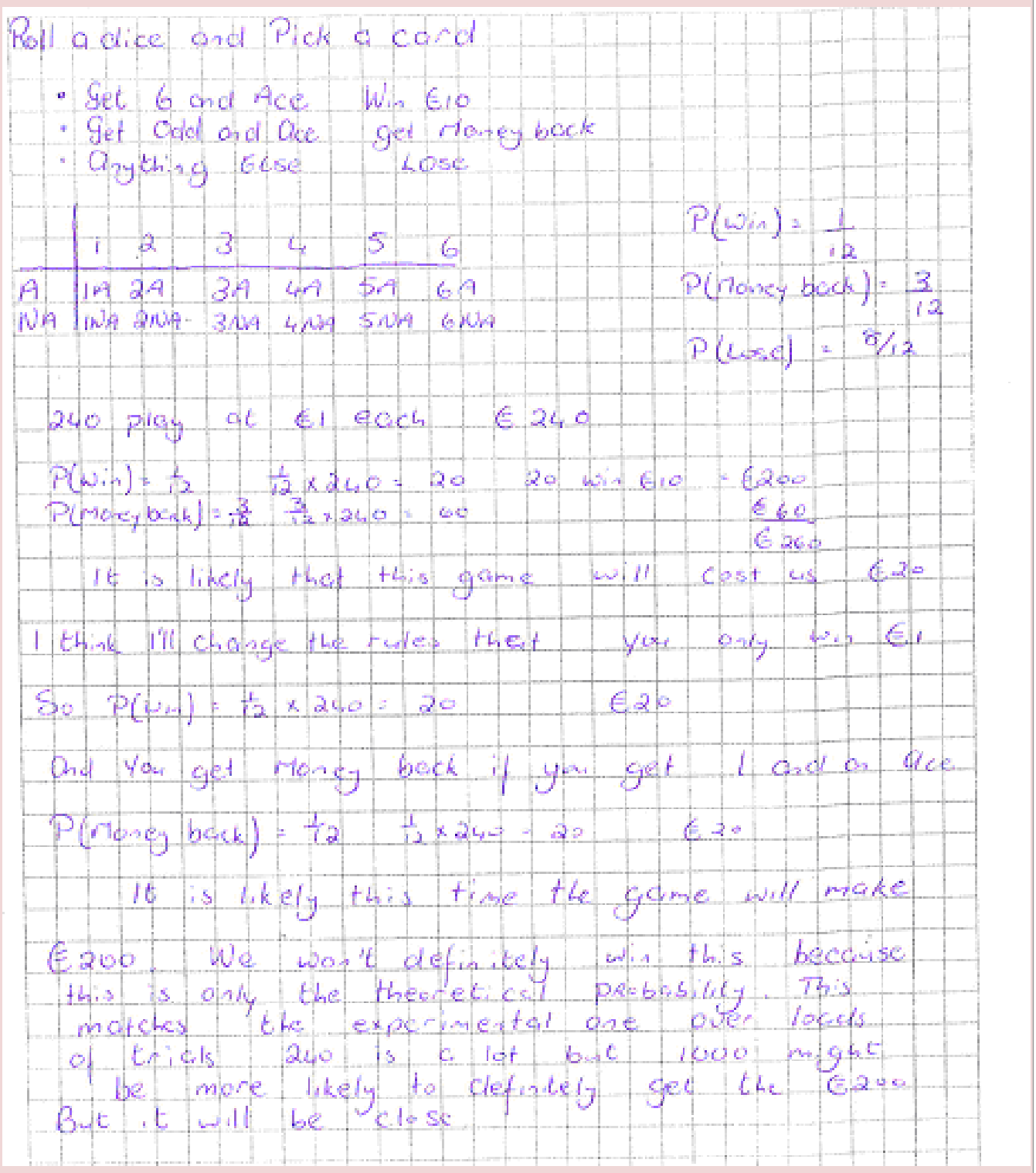
Q. 17 JCHL

Devise a game of chance that can be played in school to raise money for charity.

Your game must involve **two independent events,** for example, ‘tossing two coins’ or ‘rolling a die and tossing a coin’.

- Invent a clear set of rules for your game. You should clearly state the conditions for **winning**, **losing** and getting your **money back**.
- Give an example of how you might **“win”** the game, how you might **“lose”** the game, and how you might just get your “**money back”.**
- Decide on how much you will charge to play the game and how much a player will get if they win the game.
- Create a sample space showing **all** possible outcomes.
- Calculate the probability of winning the game.
- Assuming that 250 students play the game, calculate the profit you are likely to make.
- Will you definitely make this profit? Explain why, or why not.

Examine this piece of student work.



Roll a dice and Pick a card

- Get 6 and Ace — Win €10
- Get Odd and Ace — get Money back
- Anything Else — Lose

	1	2	3	4	5	6
A	1A	2A	3A	4A	5A	6A
NA	1NA	2NA	3NA	4NA	5NA	6NA

$P(\text{Win}) = \frac{1}{12}$

$P(\text{Money back}) = \frac{3}{12}$

$P(\text{Lose}) = \frac{8}{12}$

240 play at €1 each €240

$P(\text{Win}) = \frac{1}{12}$ $\frac{1}{12} \times 240 = 20$ 20 win €10 = €200

$P(\text{Money back}) = \frac{3}{12}$ $\frac{3}{12} \times 240 = 60$ €60

€260

It is likely that this game will cost us €20

I think I'll change the rules that you only win €1

So $P(\text{Win}) = \frac{1}{12} \times 240 = 20$ €20

And You get money back if you get 1 and an Ace.

$P(\text{Money back}) = \frac{1}{12}$ $\frac{1}{12} \times 240 = 20$ €20

It is likely this time the game will make €200. We won't definitely win this because this is only the theoretical probability. This matches the experimental one over loads of tricks. 240 is a lot but 1000 might be more likely to definitely get the €200. But it will be close.

What do you think of this piece of work? What would you do differently?

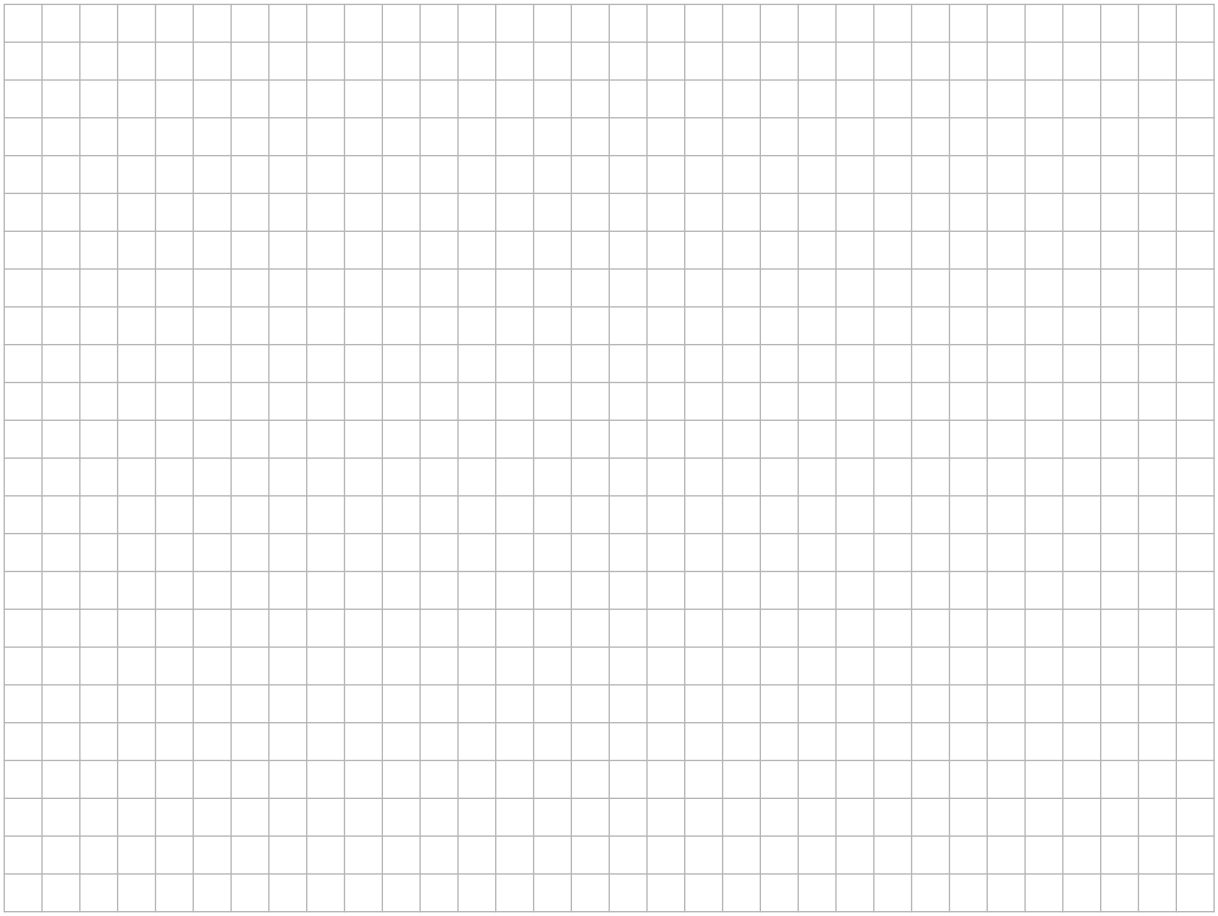
Q. 18 JCOL

Sarah and Caoimhe were raising money to help buy a scanner for the local hospital. They created a game of chance called ***Score 10 to win 10*****.** They charged **€1** to play and the prize for winning was **€10.**

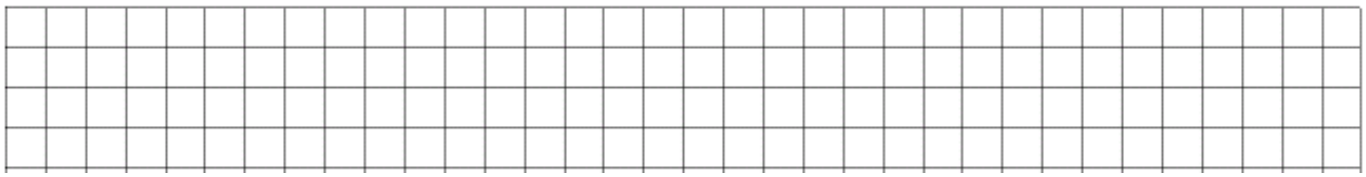
Rules: Spin a spinner numbered 1-4 and throw a die.

- If the total is odd get your money back.
- **Score 10** and Win 10.

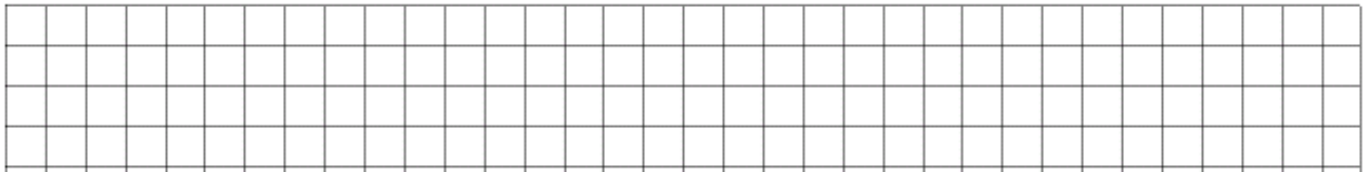
Create a sample space showing all the **possible outcomes**
Identify those outcomes that are a “win” and those that will get the money back.



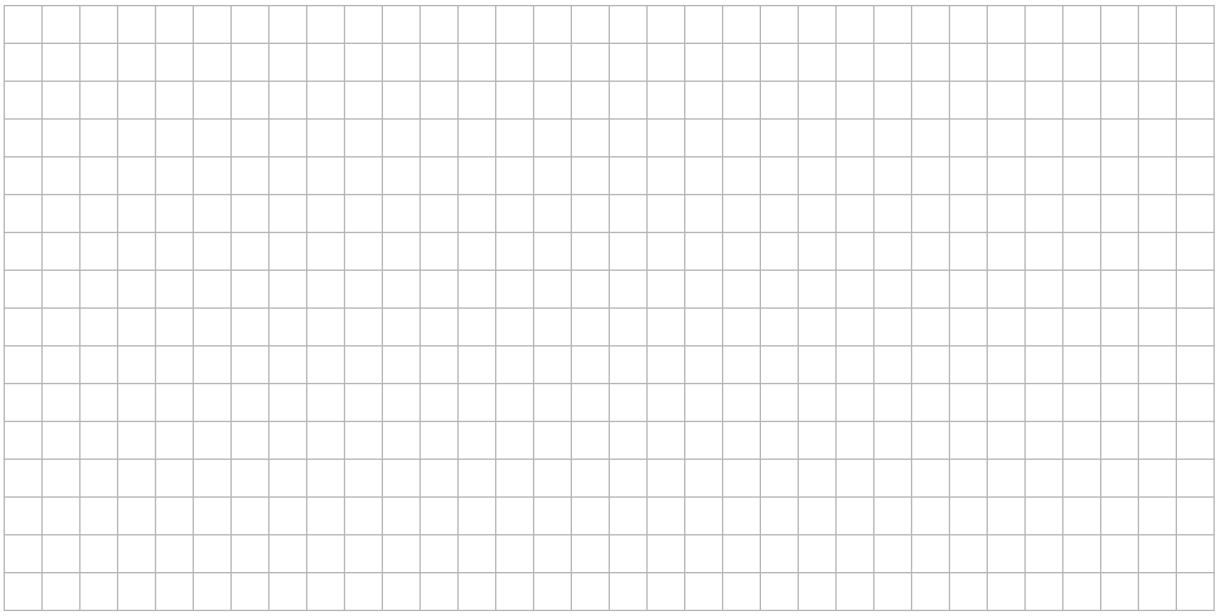
Calculate the probability of a player winning the game.



Calculate the probability of a player getting their money back.



If 240 students play the game, how much will Sarah and Caoimhe raise for the hospital scanner?



Change the rules so as to increase the profits, assuming the same number of students play.

Q. 19 JCFL

The table below shows the main causes of death in Ireland in the years **2000**, **2001** and **2002.**

Numbers

Principal cause	2000 Males	2000 Females	2001 Males	2001 Females	2002 Males	2002 Females
			Republic of Ireland			
Circulatory diseases	6,449	6,217	6,109	5,777	5,886	5,709
Respiratory diseases	2,326	2,537	2,156	2,316	2,118	2,212
Cancer	4,079	3,587	4,038	3,594	4,066	3,433
Road traffic accidents	326	109	316	95	269	85
Suicides	395	91	429	90	371	80
All other	2,617	2,658	2,643	2,649	2,507	2,612
Total deaths	**16,192**	**15,199**	**15,691**	**14,521**	**15,217**	**14,131**

What was the main cause of death of **males** in Ireland in 2002?

Newspaper reports in 2002 stated that the number of **male suicides** was on the increase in Ireland. Is there evidence from the table to support this claim?

What has happened to the total number of deaths in Ireland in the period from 2000 to 2002?

Newspaper reports claim that more **young Irish males** commit suicide than **young Irish females.** Is there evidence in the table to support this claim?

Q. 20 JCOL

A lottery takes place twice a week in Ireland. **Seven** balls are randomly chosen from **45**. If you match the first six balls drawn then you win or share the jackpot.

What is the probability of drawing ball number **5**?

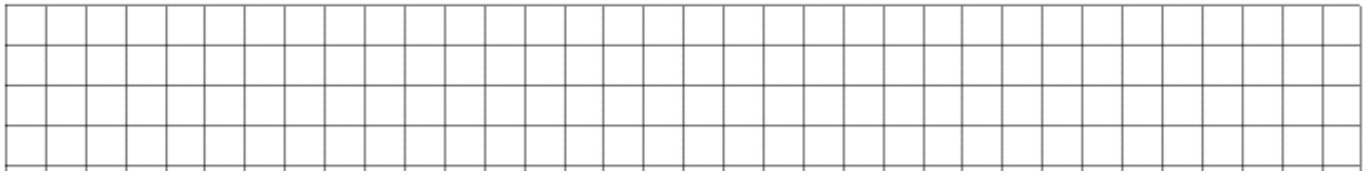
What is the probability of drawing an **odd numbered** ball?

What is the probability of drawing an **even numbered** ball?

Below is a table showing the frequency in brackets that the balls have appeared to date.

1 (58)	**2**(69)	**3**(70)	**4**(68)	**5**(68)	**6**(53)	**7**(59)	**8**(53)	**9**(65)
10(63)	**11**(55)	**12**(58)	**13**(74)	**14**(51)	**15**(66)	**16**(48)	**17**(62)	**18**(58)
19(58)	**20**(54)	**21**(69)	**22**(61)	**23**(61)	**24**(64)	**25**(40)	**26**(58)	**27**(67)
28(66)	**29**(59)	**30**(55)	**31**(58)	**32**(68)	**33**(58)	**34**(51)	**35**(60)	**36**(70)
37(55)	**38**(65)	**39**(72)	**40**(57)	**41**(54)	**42**(55)	**43**(39)	**44**(70)	**45**(53)

Write a list of the 5 most frequent numbers and the 5 least frequent numbers.



People often think that ***13*** is an unlucky number and will not choose it. Is there any evidence in the table to suggest that ***13*** is an unlucky number? Explain your reasoning.

Q. 21 JCFL

The table shows the total rainfall that fell in Ireland in the **month of July** over a 51 year period from 1958 to 2008.

Year	Total Rainfall (mm)	Year	Total Rainfall (mm)	Year	Total Rainfall (mm)
1958	110	1975	28	1992	69
1959	45	1976	83	1993	60
1960	140	1977	26	1994	65
1961	52	1978	51	1995	70
1962	68	1979	47	1996	37
1963	24	1980	39	1997	54
1964	47	1981	36	1998	54
1965	79	1982	9	1999	35
1966	37	1983	18	2000	44
1967	84	1984	31	2001	30
1968	16	1985	107	2002	68
1969	44	1986	58	2003	46
1970	68	1987	33	2004	38
1971	63	1988	80	2005	84
1972	41	1989	10	2006	18
1973	79	1990	48	2007	119
1974	100	1991	26	2008	112

If 130mm of rain fell in Ireland in July 2009, complete the table below showing the total rainfall for each of the decades listed.

Years	Total Rainfall (mm)
1960-1969	
1970-1979	
1980-1989	
1990-1999	
2000-2009	

Display your data in a way that allows you to see a pattern in the variation.

Is there any evidence to support the claim; *Julys in Ireland are getting wetter?*

Q. 22 JCHL

The table shows the number of hours per day spent by 3rd year and TY students playing on a games console.

Number of hours spent playing on a games console	Number of TY Students	Number of 3rd Year Students
1		
2	1	1
3	2	3
4	1	1
5	1	2
6	5	2
7		3
8		
9	1	3
10		1
11		3
12		2
13	3	3
14	1	1
15	4	
16	4	3
17	2	1
18	4	2
19	4	4
20	3	2
21	2	
22	3	
23	1	
24		
25	1	4

Display the data in a way that allows you to compare the two groups.

Which group of students spends more time playing on a games console? Give evidence from the data to support your answer.

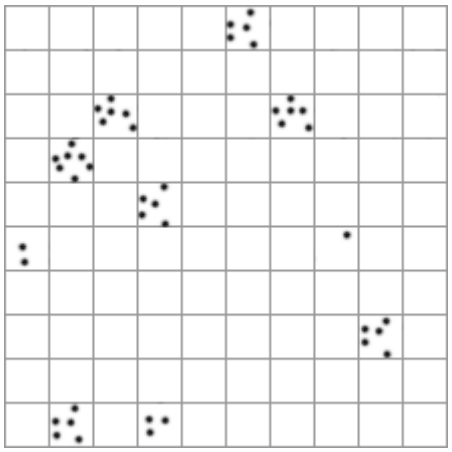
Q. 23 JCHL

Photographs taken from satellites help officials keep track of the number of different objects on the earth below.

They could be keeping track of the number of animals in remote areas, or counting the number of sheep on a farmer's land to ensure that they are claiming the correct subsidy.

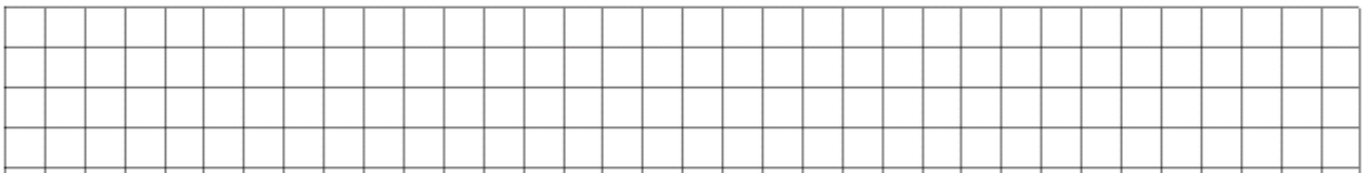
Below is a photograph of a sub-Saharan region in Africa, populated by gazelle. The area is divided into 100 sub-regions. Some of the sub-regions are obscured by cloud.

A gazelle

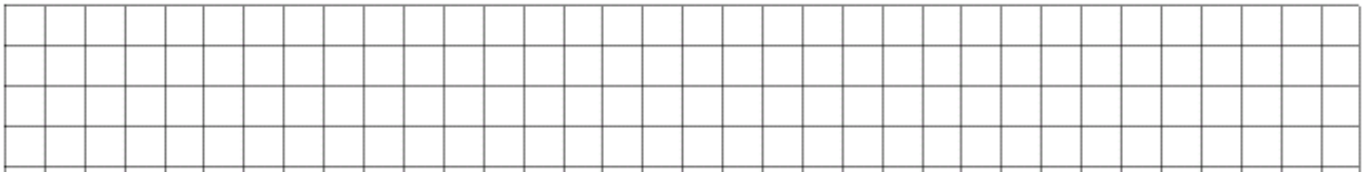


Based on the number of gazelle in this sample, make an estimate of the number of gazelle in the entire region.

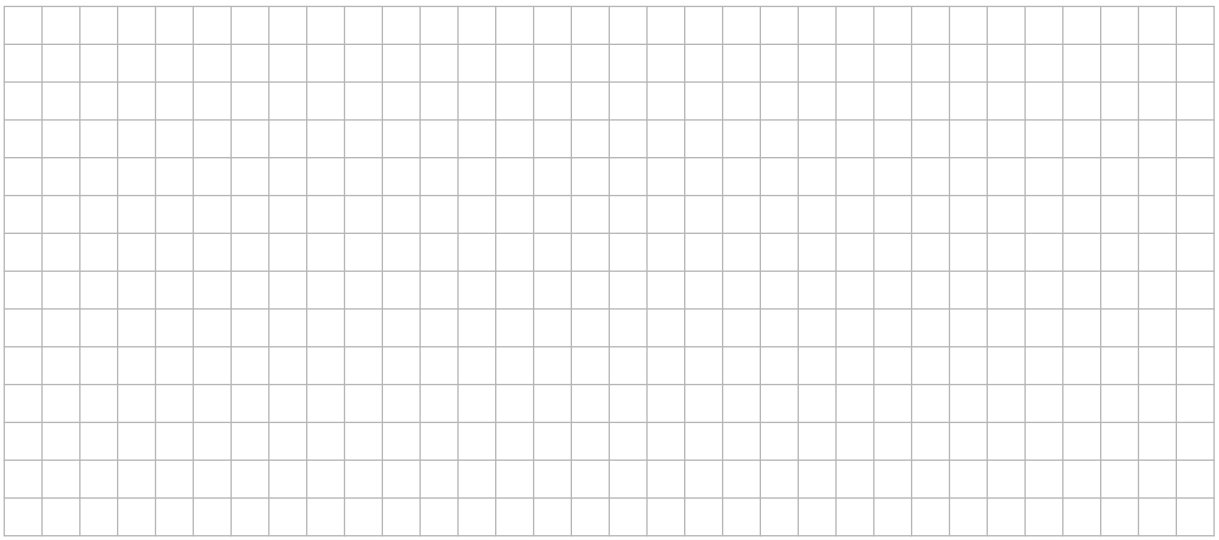
Is it possible that there are more gazelle than your estimate?



Is it possible that there are less gazelle than your estimate?



How might a smaller sample size have affected your estimate? Consider some smaller samples from the photograph to help in explaining your thinking.



Q. 24 JCFL

The table below reports the approximate lowest frequency and approximate highest frequency of the hearing ranges for humans and five other animals. Frequency is measured in Hertz (Hz), which is 1 vibration per second.

Animal	Lowest frequency	Highest frequency
Human	64	23,000
Cat	45	64,000
Dog	67	45,000
Gerbil	100	60,000
Goldfish	20	3,000
Parakeet	200	8,500

Which animal has the smallest hearing range?

What animals can hear lower frequencies than a parakeet can?

Which animal can hear the highest frequencies?

What animal has a hearing range more than twice that of a human?

Q. 25 JCFL

The table below shows some cloud formations and their recorded distances above the Earth.

Cloud Type	**Distance above the Earth (miles)**
Altocumulus	4
Altostratus	5
Cirrostratus	6
Cirrus	7
Cumulonimbus	2
Cumulus	3
Stratus	1

What is the **median** distance above the Earth of the cloud formations listed above?

Q. 26 JCOL

Sam asked the 29 students in 3rd year how many times they were absent from school last term. The results are shown in the table below.

Unfortunately a blot covers part of the table.

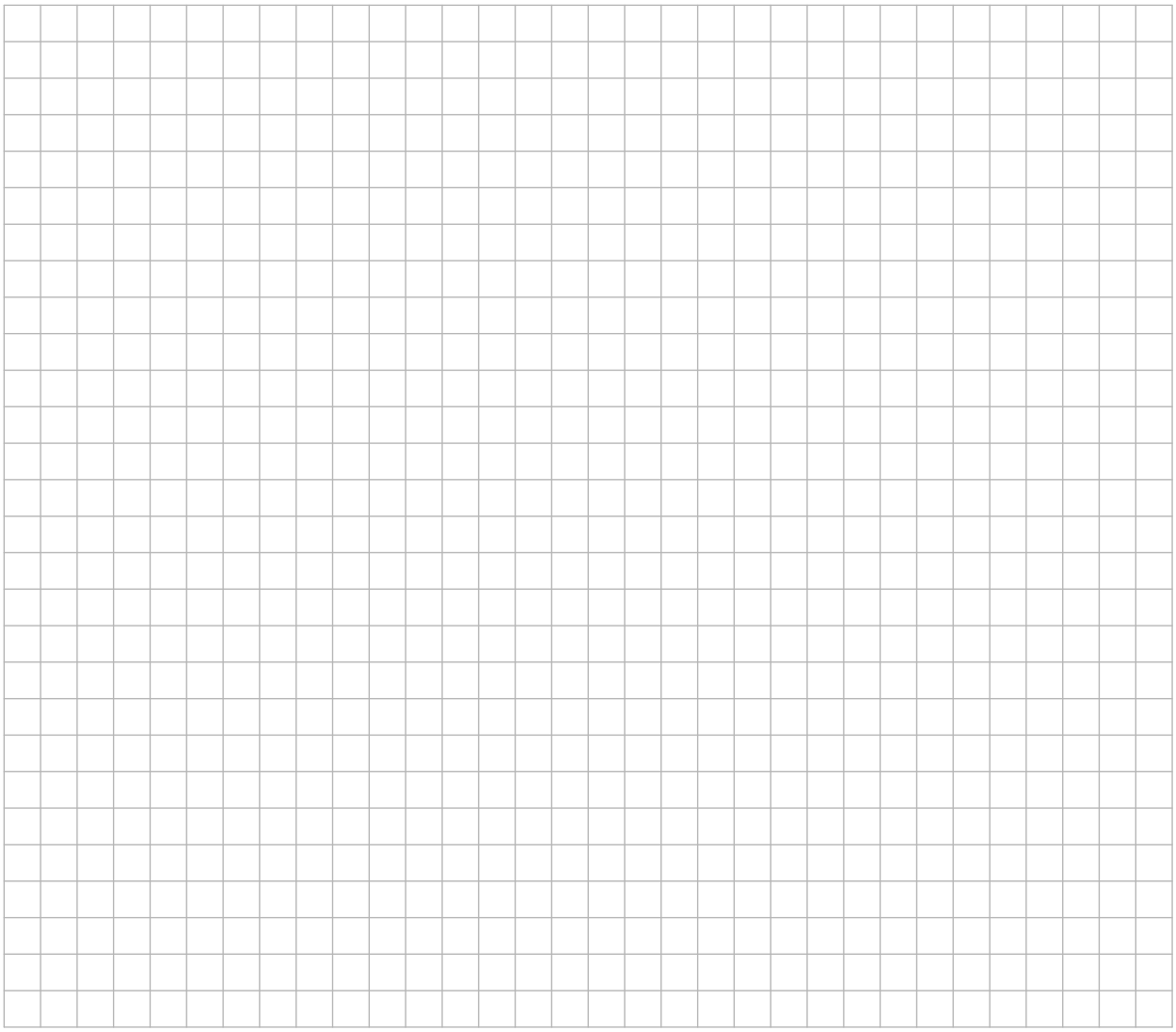
Number of days absent	Frequency
0	3
1	10
2	9
3	
4	
More than 4	1

a) (i) What might the table look like if the blot was not there? Give two possible answers.

Number of days absent	Possible Frequency 1	Possible Frequency 2
0	3	3
1	10	10
2	9	9
3		
4		
More than 4	1	1

(ii) How many possibilities are there, other than the two you have shown?

b) (i) Working from Sam's original table, calculate (if possible) the mode, median, mean and range of the data.



Q. 27 JCOL

The plot shows the heart rates of a group of 3rd years half way through their PE class.

Heart Rate (Beats/min)

8	7 7 9
9	6 7 7 7
10	4 5 6 6 8
11	1 3 4 9 9
12	2 5 5 8
13	0 0 3 4 7
14	3 5
15	7
16	9

11 | 3 = 113

Optimum heart rate is between 110 and 140 beats per minute.

How many heart rates shown on the plot are between 110 and 140 beats per minute?

Guidelines state that, if the heart rate exceeds 165 beats per minute, exercise should be stopped immediately.

Should any of these students stop exercising immediately? Explain your answer