

GCSE – Mathematics only

Tier: Higher

Grade: A/A*



Topic: Estimating conditional probabilities

Starter

Use the terms **certain**, **likely**, **even chance**, **unlikely** and **impossible** to describe the probability of the following events.

- (a) A person will be ill in your class tomorrow.
- (b) Throwing a number less than 12 on a six sided dice.
- (c) You will eat breakfast tomorrow.
- (d) A chance of choosing a green ball out of a bag full of yellow balls.

Skills:

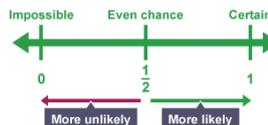
	Football	Rugby	Other	Total
Male	10	12	10	32
Female	7	8	13	28
Total	17	20	23	60

- (a) Calculate the probability of choosing a person who likes football.
- (b) What is the probability of choosing a person who likes rugby if we know that the person chosen is a girl?
- (c) This time two people will be chosen at random. Find the probability that the first person chosen likes 'other' sport and the second person likes rugby.

Top Tips!

Probability - measure of chance.

No event can ever have a probability greater than 1.



Examination Question: 2012 November Linear P2 Higher Q15

It is suggested that the three letters **a**, **e** and **r** are the most frequently used letters in the English language. Six sentences were chosen at random from a newspaper article. The total number of the letters **a**, **e** and **r** in each sentence was recorded.

Sentence number	1	2	3	4	5	6
Total number of letters a, e and r	8	6	8	3	4	5
Total number of letters in the sentence	36	22	42	8	10	14

- (a) Using all of this information, calculate the best estimate of the probability that a letter chosen at random from this article is one of the letters **a**, **e** or **r**. [2]
- (b) All of the letters from the 6 sentences are placed in a bag. Two letters are selected at random from the bag and not replaced. Calculate the probability that at least one of the letters is the letter **a**, **e** or **r**. Give your answer correct to two decimal places. You must show your working. [5]

Assessment for Learning

Video / QR code

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Topic: Estimating conditional probabilities

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Starter

Use the terms **certain, likely, even chance, unlikely** and **impossible** to describe the probability of the following events.

(a) A person will be ill in your class tomorrow. **Even chance**

(b) Throwing a number less than 12 on a six sided dice. **Certain**

(c) You will eat breakfast tomorrow. **Likely**

(d) A chance of choosing a green ball out of a bag full of yellow balls. **Impossible**

Skills:

	Football	Rugby	Other	Total
Male	10	12	10	32
Female	7	8	13	28
Total	17	20	23	60

(a) Calculate the probability of choosing a person who likes football.

$$\frac{17}{60}$$

(b) What is the probability of choosing a person who likes rugby if we know that the person chosen is a girl?

$$\frac{8}{28} = \frac{2}{7}$$

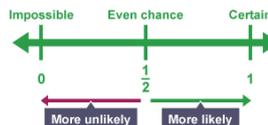
(c) This time two people will be chosen at random. Find the probability that the first person chosen likes 'other' sport and the second person likes rugby.

$$\frac{23}{60} \times \frac{20}{59} = \frac{460}{3540} = \frac{23}{177}$$

Top Tips!

Probability - measure of chance.

No event can ever have a probability greater than 1.



Examination Question: 2012 November Linear P2 Higher Q15

It is suggested that the three letters **a, e** and **r** are the most frequently used letters in the English language.

Six sentences were chosen at random from a newspaper article. The total number of the letters **a, e** and **r** in each sentence was recorded.

Sentence number	1	2	3	4	5	6
Total number of letters a, e and r	8	6	8	3	4	5
Total number of letters in the sentence	36	22	42	8	10	14

(a) Using all of this information, calculate the best estimate of the probability that a letter chosen at random from this article is one of the letters **a, e** or **r**. [2]

Total of a,e,r = 34, Total of letters = 132

$$P = \frac{34}{132} = \frac{17}{66}$$

(b) All of the letters from the 6 sentences are placed in a bag. Two letters are selected at random from the bag and not replaced. Calculate the probability that at least one of the letters is the letter **a, e** or **r**.

Give your answer correct to two decimal places.

You must show your working. [5]

$$\begin{aligned}
 P(\text{At least one of a,e,r}) &= P(\text{a,e,r, other}) + P(\text{other, a,e,r}) + P(\text{a,e,r, a,e,r}) \\
 &= \left(\frac{34}{132} \times \frac{98}{131}\right) + \left(\frac{98}{132} \times \frac{34}{131}\right) + \left(\frac{34}{132} \times \frac{33}{131}\right) \\
 &= \frac{3893}{8646} \\
 &= 0.4502\dots = 0.45 \text{ (2.d.p)}
 \end{aligned}$$

Assessment for Learning

Video / QR code