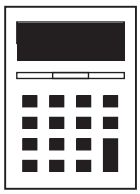
GCSE MATHEMATICS

Probability

(Challenge questions)



AQA These questions have been taken or modified from previous AQA GCSE Mathematics Papers.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information

- The marks for questions are shown in brackets.
- The quality of your written communication is specifically assessed in questions that are indicated with an asterisk (*).

Advice

- Read each question carefully before you start to answer it.
- In all calculations, show clearly how you work out your answer.
- Use the number of marks for the question as a guide to the amount of time you need to spend.
- Look at previous parts of the question, e.g. a), b), c) i) as there may be information there you need to answer later parts.
- Check your answer is realistic and appropriate.
- For calculator decimal numbers always write your full calculator display in the working out area and then, if you need to, round the answer on the answer line.

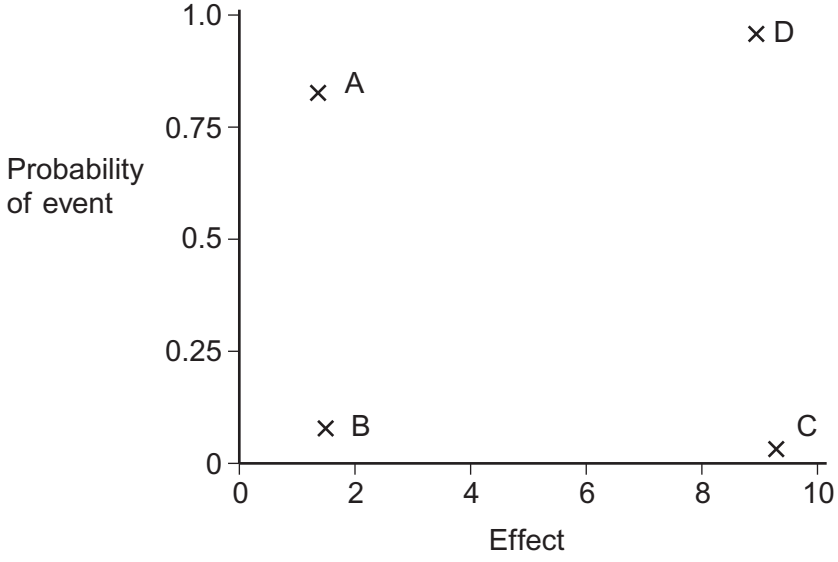
This booklet was curated and modified using AQA examination papers between 2010-2016, for thecalculatorguide.com , where you can find many more booklets on further topics. All questions used are reproduced for educational purposes only.

1 Here is a risk diagram.
The horizontal scale measures the effect of an event on a scale of 0 to 10

0 means no serious effect

10 means a very serious effect

The vertical scale shows the probability of an event happening.



Two events are described.

Event 1 A tree falls on someone.

Event 2 Someone has to queue to pay at a supermarket when the store is very busy.

1 (a) Which point on the diagram best matches **Event 1**?
Circle your answer.

[1 mark]

A B C D

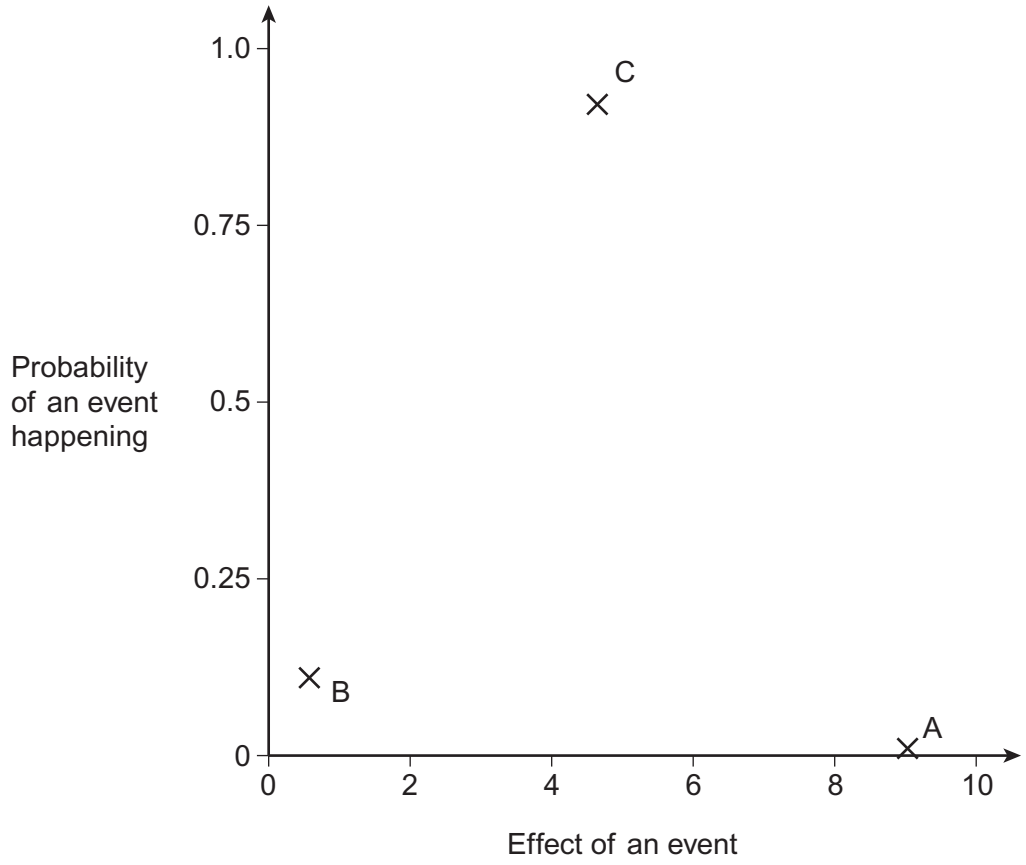
1 (b) Which point on the diagram best matches **Event 2**?
Circle your answer.

[1 mark]

A B C D

2 Jane is doing an exercise on assessing risk.
She draws the diagram below.

The vertical scale shows the probability of an event happening.
Jane measures the effect of each event on a scale of 0 to 10.
0 means no serious effect.
10 means a very serious effect.



2 (a) Match each of the three following events with the points on the diagram.

Event	Point
Being struck by lightning	
Being stuck in a lift	
Slipping on ice in winter	

(2 marks)

2 (b) Give a reason for your choice of point for the event 'Being struck by lightning'

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(1 mark)

3 (a) Work out $0.15^2 \times (1 - 0.15)^3$

Give your answer in standard form to 2 significant figures.

[2 marks]

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Answer .....

3 (b) In an experiment

the probability of A is 3.9×10^{-7}
the probability of B is 1.2×10^{-8}

How many times more likely is A than B?

[2 marks]

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Answer .....

4 A game had 100 lettered tiles.

The probability of choosing an A at random was $\frac{3}{25}$

20 tiles were then lost.

The probability of choosing an A at random is now $\frac{1}{10}$

How many A tiles were lost?

[3 marks]

Answer _____

5 A, B, C and D are the four possible results of a game.

The table gives the probabilities for B and C.

Result	A	B	C	D
Probability		0.12	0.28	

***5 (a)** P(A) = 2P(B)

Show that P(D) = 3P(B)

[3 marks]

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5 (b) The game was played 200 times.
Result C occurred 6 **more** times than expected.

How many times was C the result?

[3 marks]

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Answer .....

6 An experiment has four possible outcomes, A, B, C and D.
The table shows the probabilities of the four outcomes.

A	B	C	D
x	$3x$	0.2	$6x$

6 (a) Write and solve an equation to work out the value of x.

[2 marks]

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x = ...

6 (b) Hence, work out the value of P(A or B).

[2 marks]

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Answer .....

7 C and D are independent events.

The probability of C happening is p.
The probability of D happening is $2p$.

The probability that both C and D happen is 0.045

What is the probability that both C and D do **not** happen?

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Answer ..... *(5 marks)*

8 Robin is firing arrows at a target.

The probability that he hits the target on his x^{th} attempt is $\frac{x + 2}{x + 3}$

For example Probability (hit on his 5^{th} attempt) = $\frac{7}{8}$

8 (a) Work out the probability that he hits the target with both his 1^{st} and 2^{nd} attempts.

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Answer ..... *(3 marks)*

8 (b) Work out the probability that he hits the target **exactly** once on his first two attempts.

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Answer ..... *(4 marks)*

9 (a) A bag contains d discs.
y discs are yellow.
Two discs are picked at random without replacement.

Show that the probability of picking two yellow discs is $\frac{y^2 - y}{d^2 - d}$

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(2 marks)

9 (b) A bag contains coloured discs.
Seven of the discs are blue.
Two discs are picked at random from the bag without replacement.

The probability of picking two blue discs is $\frac{42}{110}$

What is the probability that neither of the two discs chosen is blue?

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Answer ..... *(4 marks)*