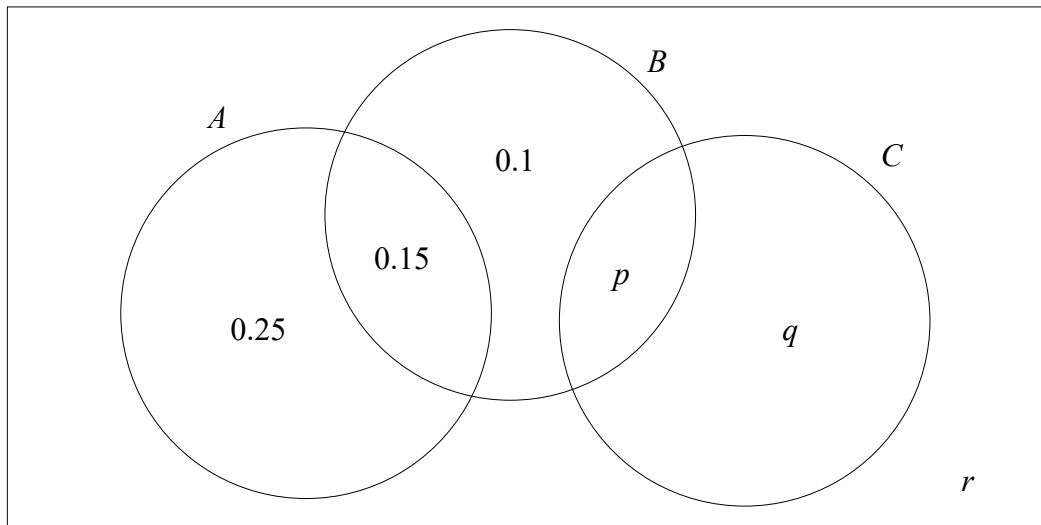


## AS Level Maths: Probability

- 1 The Venn diagram below shows three events  $A$ ,  $B$  and  $C$ .



- (a) Write down two of the events that are mutually exclusive.

(1)

Events  $A$  and  $B$  are independent.

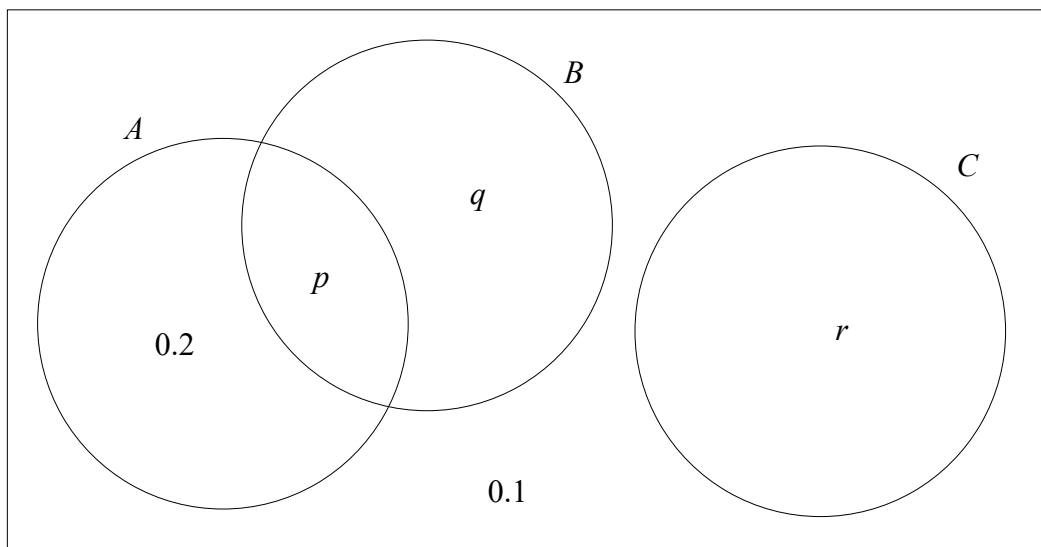
The probability of  $C$  is 0.3

- (b) Find the values of  $p$ ,  $q$  and  $r$ .

(5)

(Total for question 1 is 6 marks)

- 2 The Venn diagram below shows three events  $A$ ,  $B$  and  $C$ .



- (a) Write down two of the events that are mutually exclusive.

(1)

The probability of  $A$  is 0.4

The probability of  $A$  or  $B$  is 0.7

- (b) Find the values of  $p$ ,  $q$  and  $r$ .

(2)

- (c) State, giving a reason, whether or not the events  $A$  and  $B$  are statistically independent.

(2)

(Total for question 2 is 5 marks)

3 Raheem asks 50 people which sports they watch. They can choose from football, golf and hockey.

5 people watch all three sports.

8 people watch football and golf

7 people watch golf and hockey

9 people watch football and hockey

31 people watch football

13 people watch golf

17 people watch hockey.

(a) Draw a Venn diagram for this information. (3)

(b) Two people are selected at random find the probability they both watch football. (2)

(Total for question 3 is 5 marks)

4 For the events A and B.

The probability of A is 0.6

The probability of B is 0.5

The probability of neither A or B is 0.1.

(a) Find  $P(A \text{ and } B)$  (2)

(b) Draw a Venn diagram for this information. (2)

(c) Determine whether A and B are independent. (2)

(Total for question 4 is 6 marks)

5 Two events A and B are independent and  $P(A) = 0.4$  and  $P(B) = 0.3$

(a) Find  $P(A \text{ and } B)$  (3)

(b) Draw a Venn diagram for this information. (2)

(Total for question 5 is 5 marks)

6 Two events A and B are mutually exclusive and  $P(A) = 0.4$  and  $P(B) = 0.3$

(a) Write down  $P(A \text{ and } B)$  (1)

(b) Draw a Venn diagram for this information. (3)

(Total for question 6 is 4 marks)

7 Two events A and B are such that  $P(A) = 0.6$  and  $P(B) = 0.5$  and  $P(A \text{ and } B) = 0.4$

Draw a Venn diagram for this information.

(Total for question 7 is 3 marks)

- 8** A box contains 10 milk chocolates and 8 dark chocolates. Connor takes two chocolates at random. Find the probability Connor takes

- (a) Two dark chocolates (2)
- (b) One milk chocolate and one dark chocolate. (2)

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(Total for question 8 is 4 marks)

- 9** A bag contains 10 blue counters, 8 red counters and 6 green counters. Two counters are removed from the bag at random. Find the probability that the two counters removed are:

- (a) both red (2)
- (b) different colours (2)

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(Total for question 9 is 4 marks)

- 10** The probability a tennis player gets her first serve in court is 65%.  
If she gets her first serve in court the probability of winning the point is 81%.  
The chance of getting her second serve in court is 84% and if she gets her second serve in court the chance of winning the point is 59%.  
If the tennis player fails to get her second serve in court she loses the point.

- (a) Draw a tree diagram to show this information. (3)
- (b) Find the probability of the tennis player winning the point. (2)

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(Total for question 10 is 5 marks)

- 11** A company has three machines that produce a component. Machine A produces 40% of the components. Machine B produces 35% of the components and machine C produces 25% of the components.

If a component is produced by machine A the chance that it will be faulty is 3%.  
If a component is produced by machine B the chance that it will be faulty is 2%.  
If a component is produced by machine C the chance that it will be faulty is 1%.

- (a) Draw a tree diagram to show this information. (3)
- A component is selected at random. Find the probability:
- (b) it is from machine A and faulty. (2)
- (c) it is faulty. (2)

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(Total for question 11 is 7 marks)

- 12** A company has three machines that produce a component. Machine A produces 20% of the components, machine B produces 45% of the components and machine C produces the rest of the components.

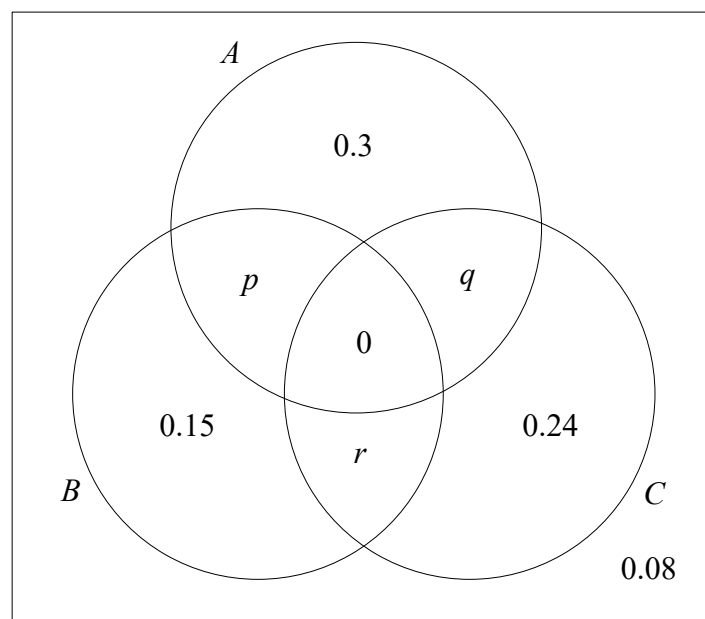
4% of the components produced are faulty.

Of the components produced by machine A, 3% are faulty and of the components produced by machine B, 5% are faulty.

Find the percentage of components produced by machine C that are faulty.

**(Total for question 12 is 3 marks)**

- 13** The Venn diagram below shows three events  $A$ ,  $B$  and  $C$ .



Events  $A$  and  $C$  are mutually exclusive.

Events  $A$  and  $B$  are independent.

Find the values of  $p$ ,  $q$  and  $r$ .

**(Total for question 13 is 5 marks)**