# GCSE (9–1) MATHEMATICS

Topic Check In - 11.02 Combined events and probability diagrams

1. Tom chooses one of the following cards at random and reads the letter written on it.

   | S | C | I | E | N | C | E |

   List all the possible outcomes.

2. The probability that Asif is late for school is 0.1.
   What is the probability that Asif is not late for school?

3. The Venn diagram below shows the factors of 12 and 54.
   List the numbers which are factors of both 12 and 54.
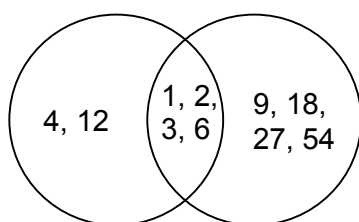
4. Chitra flips a fair coin and rolls a fair, normal 6-sided dice.
   Complete the table to show all the possible outcomes.

Coin	H	H										
Dice	1	2										

5. Ali (A), Ben (B) and Chris (C) race each other.
   List all the different orders in which they could finish.

6. The probability that Gill walks to work is 0.4. The probability that she drives to work is 0.6. How do you know that she never cycles to work?

7. Mary sees the following advert.

   > Carl's Ice Cream Parlour
   >
   > Vanilla (V)   Toffee (T)   Strawberry (S)   Chocolate (C)
   > Choose any two scoops for only £2.50

   Show that she has 10 different combinations to choose from.

8. Anne flips 2 coins. She says:

   "The probability of getting 2 heads is $\frac{1}{2}$ and the probability of getting a head and a tail is also $\frac{1}{2}$."

   Assuming she is correct, what can you say about the two coins?

9. A bag contains only black counters and white counters.

   The probability of picking a black counter is $\frac{1}{4}$. If there are 3 black counters, how many of the counters in the bag are white?

10. The Venn diagram below shows the results of a survey of dog and cat owners.
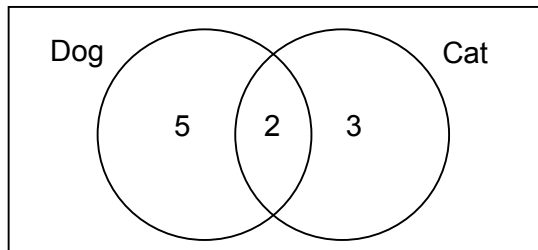
   Calculate the probability that one owner picked at random owns both a dog and a cat.

Extension

There are three fair, normal 6-sided dice. Two are red and one is green.
You roll all three dice, add the two numbers on the red dice and take away the number on the green dice. What are all the different answers you could get? Which is most likely?

Answers

1. S C I E N

2. 0.9

3. 1, 2, 3, 6

4.

Coin	H	H	H	H	H	H	T	T	T	T	T	T
Dice	1	2	3	4	5	6	1	2	3	4	5	6

5. ABC, ACB, BAC, BCA, CAB, CBA

6. 0.4 + 0.6 = 1, so cycling is not possible as the sum of all probabilities equals 1.

7.

V	V	T	S	C
T	T	S	C	
S	S	C		
C	C			

[Some students may have 16 combinations but this includes double flavours being counted twice e.g. TC and CT.]

8. Coins are not fair [one coin has 2 heads; the other coin has 1 head and 1 tail]

9. 9

10. 0.2 oe

Extension

The numbers ⁻4 to 11 can be made. Most likely are 1 to 6.

Score	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
Number of occurrences	1	3	6	10	15	21	21	21	21	21	21	15	10	6	3	1

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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Systematic listing of outcomes.			
AO1	2	Use P(A) + P(not A) = 1.			
AO1	3	Read information from a Venn diagram.			
AO1	4	Complete a sample space diagram.			
AO1	5	List the outcomes of simple combinations of events.			
AO2	6	Know that the sum of all possible probabilities must equal 1.			
AO2	7	List the outcomes of simple combinations of events using a systematic approach.			
AO2	8	Consider all possible outcomes of two events.			
AO3	9	Use probability to solve problems.			
AO3	10	Calculate probability from information displayed in a Venn diagram.			