6 An amateur weather forecaster describes each day as either sunny, cloudy or wet. He keeps a record each day of his forecast and of the actual weather. His results for one particular year are given in the table.

		Weather Forecast			Total
		Sunny	Cloudy	Wet	
Actual Weather	Sunny	55	12	7	74
	Cloudy	17	128	29	174
	Wet	3	33	81	117
Total		75	173	117	365

A day is selected at random from that year.

(i) Show that the probability that the forecast is correct is $\frac{264}{365}$. [2]

Find the probability that

(ii) the forecast is correct, given that the forecast is sunny, [2]

(iii) the forecast is correct, given that the weather is wet, [2]

(iv) the weather is cloudy, given that the forecast is correct. [2]

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[**Turn over**

(handwritten: $\frac{55+128+81}{365}$ $\frac{55}{75}$ $\frac{81}{117}$ $\frac{128}{264}$)

5 A school athletics team has 10 members. The table shows which competitions each of the members can take part in.

		Competiton				
		100 m	200 m	110 m hurdles	400 m	Long jump
Athlete	Abel	✓	✓			✓
	Bernoulli		✓		✓	
	Cauchy	✓		✓		✓
	Descartes	✓	✓			
	Einstein		✓		✓	
	Fermat	✓		✓		
	Galois				✓	✓
	Hardy	✓	✓			✓
	Iwasawa		✓		✓	
	Jacobi			✓		

An athlete is selected at random. Events A, B, C, D are defined as follows.

A: the athlete can take part in exactly 2 competitions.
B: the athlete can take part in the 200 m.
C: the athlete can take part in the 110 m hurdles.
D: the athlete can take part in the long jump.

(i) Write down the value of $P(A \cap B)$. [1]

(ii) Write down the value of $P(C \cup D)$. [1]

(iii) Which two of the four events A, B, C, D are mutually exclusive? [1]

(iv) Show that events B and D are not independent. [2]

(handwritten: $\frac{4}{10}$ $\frac{6}{10}$ B, C $P(B) = \frac{6}{10}$ $P(D) = \frac{4}{10}$)

5   **Answer part (i) of this question on the insert provided.**

The lowest common multiple of two integers, x and y, is the smallest positive integer which is a multiple of both x and y. So, for example, the lowest common multiple of 4 and 6 is 12.

(i) On the insert, complete the table giving the lowest common multiples of all pairs of integers between 1 and 6. [1]

		Second integer					
		1	2	3	4	5	6
	1	1	2	3	4	5	6
	2	2	2	6	4	10	6
First integer	3	3	6	3	12	15	6
	4	4	4	12	4	20	12
	5	5	10	15	20	5	30
	6	6	6	6	12	30	6

Two fair dice are thrown and the lowest common multiple of the two scores is found.

(ii) Use the table to find the probabilities of the following events.

(A) The lowest common multiple is greater than 6. [1] $\frac{12}{36}$

(B) The lowest common multiple is a multiple of 5. [1] $\frac{11}{36}$

(C) The lowest common multiple is both greater than 6 and a multiple of 5. [2] $\frac{8}{36}$

(iii) Use your answers to part (ii) to show that the events "the lowest common multiple is greater than 6" and "the lowest common multiple is a multiple of 5" are not independent. [2]

$\frac{11}{36} + \frac{12}{36}$ c $\frac{132}{36^2}$ $\neq$ $\frac{8 \times 36}{36^2}$ $\frac{288}{36^2}$

So   not   independent