H15-test Conditional Probability (Higher): Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A gym surveyed 80 members on whether they attend on weekday mornings and whether they attend on weekend mornings. The two-way table shows the results.

	Weekend mornings	No weekend mornings	Total
Weekday mornings	24	16	40
No weekday mornings	10	30	40
Total	34	46	80

(a) Write down the number of members who attend on both weekday mornings and weekend mornings. **(1)**

.....

(b) One member is chosen at random from those who attend weekend mornings. Find the probability that this member also attends weekday mornings. **(2)**

.....

(c) Explain what is meant by P(weekday mornings | weekend mornings) in the context of this table. **(1)**

(Total for Question 1 is 4 marks)

2 For statements (i) to (iii), write down whether each is True or False. For part (iv), select the correct option.

(i) If P(A|B) = P(A), then events A and B are independent. **(1)**

(ii) P(A|B) is always equal to P(B|A). **(1)**

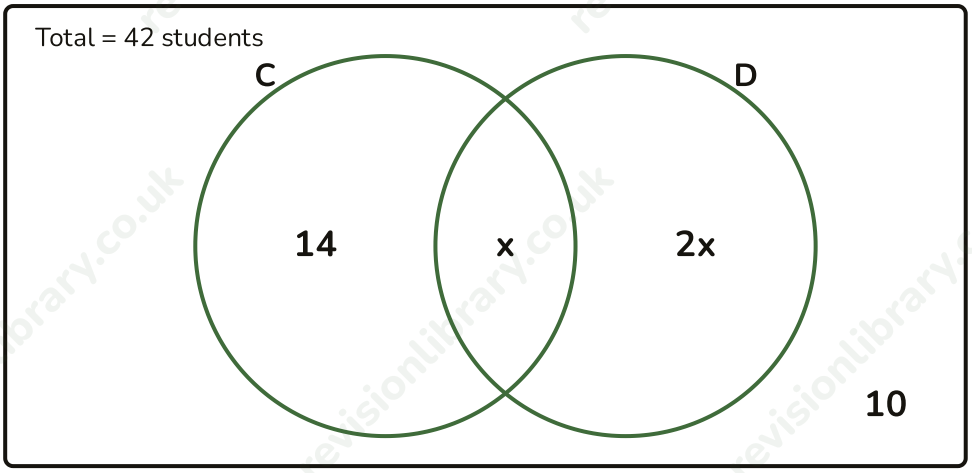
(iii) For any two events A and B, P(A and B) = P(A) x P(B). **(1)**

(iv) Which expression is equal to P(A|B)? **(1)**

- ☐ A) P(A and B) / P(A)
- ☐ B) P(A and B) / P(B)
- ☐ C) P(A) x P(B)
- ☐ D) P(A) + P(B) - P(A and B)

(Total for Question 2 is 4 marks)

3 In a survey of 42 students, C is the event that a student has a pet cat and D is the event that a student has a pet dog. The Venn diagram shows the number of students in each region, where x is a positive whole number.



C = has a pet cat D = has a pet dog

(a) Use the fact that the four regions in the Venn diagram total 42 to form and solve an equation in x. **(2)**

.....

(b) Find P(C | D). **(2)**

.....

(c) Find P(D | C'), where C' means 'does not have a pet cat'. **(3)**

.....

(Total for Question 3 is 7 marks)

4 A drawer contains 12 batteries, of which 5 are faulty. Two batteries are selected at random, one after another, without replacement.

(a) Find the probability that neither battery selected is faulty. **(2)**

.....

(b) Hence find the probability that at least one of the two batteries is faulty. **(2)**

.....

(c) Find the probability that exactly one of the two batteries is faulty. **(3)**

.....

(Total for Question 4 is 7 marks)

Mark scheme · H15-test Conditional Probability (Higher): Test Pack

Question 1

- (a) **B1** 24 cao
- **(a) Answer: 24**
- (b) **M1** 24/34 seen, oe
- (b) **A1** 12/17 oe cao
- **(b) Answer: 12/17**
- (c) **B1** correct explanation: the probability that a member attends weekday mornings, given that they are known to attend weekend mornings
- **(c) Answer: The probability that a member attends weekday mornings, given that they attend weekend mornings.**

Question 2

- (i) **B1** True cao
- **(i) Answer: True**
- (ii) **B1** False cao
- **(ii) Answer: False**
- (iii) **B1** False cao
- **(iii) Answer: False**
- (iv) **B1** B cao
- **(iv) Answer: B) P(A and B) / P(B)**

Question 3

- (a) **M1** 14 + x + 2x + 10 = 42, oe
- (a) **A1** x = 6
- **(a) Answer: x = 6**
- (b) **M1** 6/(6 + 12), oe, using x = 6 so intersection = 6 and D only = 12
- (b) **A1** 1/3 oe cao
- **(b) Answer: 1/3**
- (c) **M1** identifies n(C') = D only + neither = 12 + 10 = 22
- (c) **M1** 12/22, oe
- (c) **A1** 6/11 oe cao
- **(c) Answer: 6/11**

Question 4

- (a) **M1** 7/12 x 6/11, oe
- (a) **A1** 7/22 oe cao
- **(a) Answer: 7/22**
- (b) **M1** 1 - their (a), oe
- (b) **A1** 15/22 oe cao
- **(b) Answer: 15/22**
- (c) **M1** 5/12 x 7/11, oe (faulty then not faulty)
- (c) **M1** 7/12 x 5/11, oe (not faulty then faulty), added to the previous product
- (c) **A1** 35/66 oe cao
- **(c) Answer: 35/66**