HIGHER

7.17 Conditional Probability: 30-minute Pack

Total Marks

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A class committee of 10 students contains 6 girls and 4 boys. Two students are chosen at random from the committee, one after another, without replacement.

(a) Find the probability that both students chosen are girls. **(2)**

.....

(b) Find the probability that at least one boy is chosen. **(3)**

.....

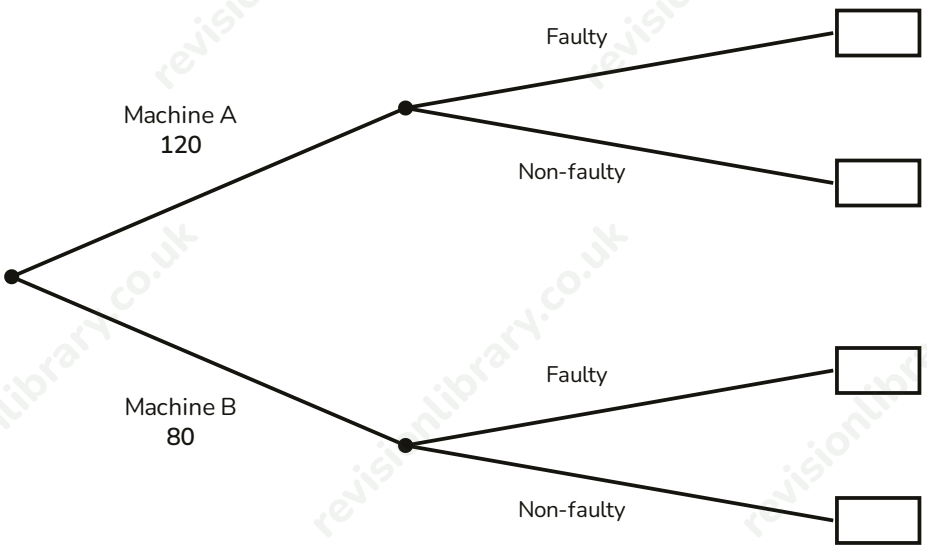
(Total for Question 1 is 5 marks)

2 A quality check finds 4 defective items and 16 good items in a box of 20. Two items are selected without replacement. Work out the probability that the second item selected is defective given that the first selected was defective.

(Total for Question 2 is 1 mark)

© Revision Library | revisionlibrary.co.uk

3 A factory has two machines, A and B, producing circuit boards in one day. Machine A produces 120 boards, of which 6 are faulty. Machine B produces 80 boards, of which 12 are faulty.



(a) Complete a frequency tree to show this information, including the total number of faulty and non-faulty boards. **(3)**

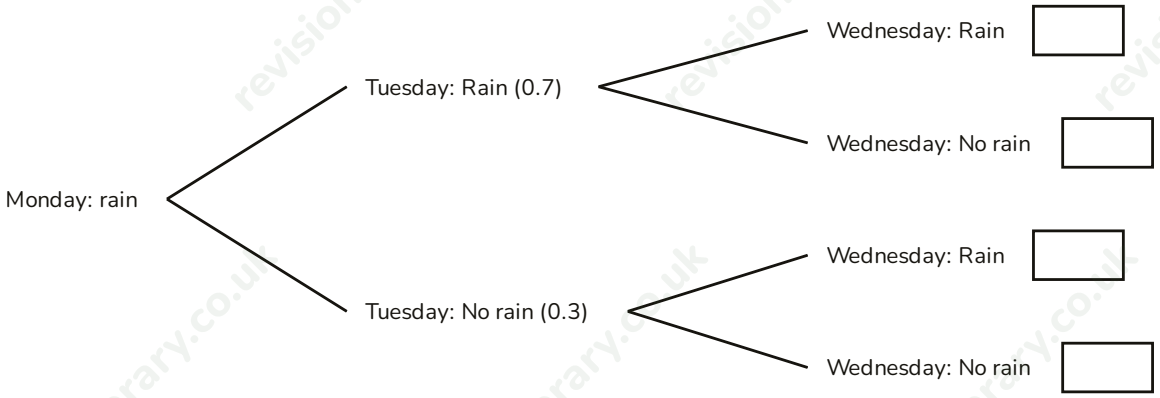
(b) A board is chosen at random from the day's production and found to be faulty. Find the probability that it was produced by Machine B. **(3)**

.....

(Total for Question 3 is 6 marks)

© Revision Library | revisionlibrary.co.uk

4 On any given day, the probability of rain depends on whether it rained the previous day. P(rain tomorrow | rain today) = 0.7. P(rain tomorrow | no rain today) = 0.25. It rained on Monday.



(a) Draw a tree diagram for Tuesday and Wednesday, and find the probability that it rains on both Tuesday and Wednesday. **(2)**

.....

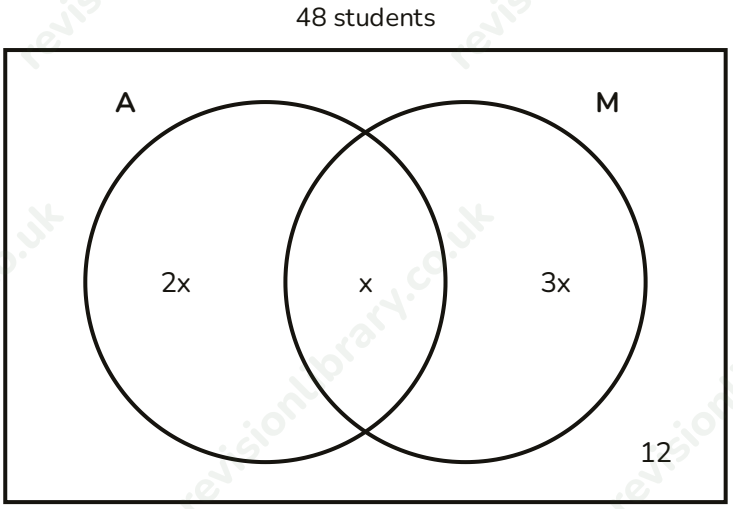
(b) Find the probability that it rains on at least one of Tuesday or Wednesday. **(3)**

.....

(Total for Question 4 is 5 marks)

© Revision Library | revisionlibrary.co.uk

5 In a school of 48 students, A is the event 'studies Art' and M is the event 'studies Music'. On the Venn diagram, n(A and M) = x, the number studying only Art is 2x, the number studying only Music is 3x, and the number studying neither is 12.



(a) Show that x = 6. **(2)**

(b) Find P(A), the probability that a student chosen at random studies Art. **(2)**

(c) Given that a student studies Art, find the probability that they also study Music. **(2)**

(Total for Question 5 is 6 marks)

---

6 A box contains 3 white, 2 black and 1 red ball. Two balls are drawn at random without replacement. Given that the second ball drawn is white, work out the probability that the first ball drawn was red.

(Total for Question 6 is 3 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 7.17 Conditional Probability: 30-minute Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

(a) 6/10 x 5/9 **M1**

(a) 1/3 oe cao **A1**

(a) Answer: 1/3

(b) recognises at least one boy = 1 - P(both girls) **M1**

(b) 1 - 1/3 **M1**

(b) 2/3 oe cao **A1**

(b) Answer: 2/3

Question 2

3/19 cao **B1**

Answer: 3/19 (cao)

Question 3

(a) Machine A: 6 faulty, 114 non-faulty **B1**

(a) Machine B: 12 faulty, 68 non-faulty **B1**

(a) Totals: 18 faulty, 182 non-faulty, 200 boards overall **B1**

(a) Answer: A: 6 faulty, 114 non-faulty. B: 12 faulty, 68 non-faulty. Totals: 18 faulty, 182 non-faulty, 200 in total.

(b) total faulty = 18 identified **M1**

(b) 12/18 formed **M1**

(b) 2/3 oe cao **A1**

(b) Answer: 2/3

Question 4

(a) 0.7 x 0.7 **M1**

(a) 0.49 cao **A1**

(a) Answer: 0.49

(b) P(no rain Tue) = 0.3 and P(no rain Wed | no rain Tue) = 0.75 identified **M1**

(b) 0.3 x 0.75 (= 0.225) and 1 - 0.225 used **M1**

(b) 0.775 cao **A1**

(b) Answer: 0.775

Question 5

(a) 2x + 3x + x + 12 = 48 formed (oe 6x + 12 = 48) **M1**

(a) x = 6 cso **A1**

(a) Answer: x = 6

(b) n(A) = 2x + x = 18 (using x = 6) **M1**

(b) 3/8 oe cao **A1**

(b) Answer: 3/8

(c) 6/18 seen **M1**

(c) 1/3 oe cao **A1**

(c) Answer: 1/3

Question 6

compute P(first red and second white) = (1/6)*(3/5) = 1/10 **M1**

compute P(second white) = P(first white then white) + P(first black then white) + P(first red then white) = (3/6*2/5)+(2/6*3/5)+(1/6*3/5) = 1/5 + 1/5 + 1/10 = 1/2 **M1**

P(first red | second white) = (1/10)/(1/2) = 1/5 cao **A1**

Answer: 1/5 (0.2) (cao)

© Revision Library | revisionlibrary.co.uk