HIGHER

8.11 Probability Equation Questions: 30-minute Pack

Total Marks

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A bag contains 5 white counters and y black counters. The probability of drawing a black counter is 2/7. Work out y.

(Total for Question 1 is 2 marks)

---

2 A spinner has sections labelled 1, 2 and 3. It is altered so there are x sections labelled 3 and one section labelled 1 and one labelled 2. All the sections are equal in size. The probability of landing on 3 is 3/5. Write down an equation in x.

(Total for Question 2 is 1 mark)

---

3 A packet contains 4 green sweets and n orange sweets. Two sweets are chosen at random without replacement. The probability both are orange is 1/3. Form an equation and find n.

(Total for Question 3 is 3 marks)

© Revision Library | revisionlibrary.co.uk

4 In a class of 45 students, the number who study French is 2x, the number who study Spanish is (x + 7), and the number who study German is (x - 2). Every student studies exactly one of these three languages.

(a) Form and solve an equation to find the value of x. **(3)**

.....

(b) A student from the class is selected at random. Find the probability that the student studies German. **(2)**

.....

(Total for Question 4 is 5 marks)

---

5 A biased spinner can land on Win or Lose only. The probability that it lands on Win is (2x + 1)/9. The probability that it lands on Lose is (x + 2)/9.

(a) Form and solve an equation to find the value of x. **(3)**

.....

(b) Hence find the probability that the spinner lands on Win. **(1)**

.....

(Total for Question 5 is 4 marks)

© Revision Library | revisionlibrary.co.uk

6 A biased coin is such that the probability of landing on heads is p, where $p > 0.5$. The coin is flipped twice. The probability of getting exactly one head is 0.48.

(a) Show that $p^2 - p + 0.24 = 0$. **(3)**

(b) Hence find the value of p. **(3)**

(Total for Question 6 is 6 marks)

---

7 A bag contains n counters. 3 of the counters are pink, the rest are white. Two counters are taken from the bag at random, without replacement. The probability that both counters are pink is 1/15.

(a) Show that $n^2 - n - 90 = 0$. **(3)**

(b) Hence find the value of n. **(2)**

(Total for Question 7 is 5 marks)

© Revision Library | revisionlibrary.co.uk

Mark scheme · 8.11 Probability Equation Questions: 30-minute Pack

Question 1

form equation y/(5 + y) = 2/7 or equivalent	**M1**
y = 2 cao	**A1**

Answer: 2

Question 2

x/(x + 2) = 3/5 or equivalent	**B1**

Answer: x/(x+2) = 3/5

Question 3

form (n/(n + 4)) * ((n - 1)/(n + 3)) = 1/3 or equivalent	**M1**
multiply out to obtain quadratic and rearrange correctly	**M1**
n = 6 cao (reject negative or non-integer roots)	**A1**

Answer: 6

Question 4

(a) 2x + (x + 7) + (x - 2) = 45 oe	**M1**
(a) 4x + 5 = 45 (correct collection of terms)	**M1**
(a) x = 10 cao	**A1**

(a) Answer: x = 10

(b) German count = x - 2 = 8 ft from (a)	**M1**
(b) 8/45 oe cao	**A1**

(b) Answer: 8/45

Question 5

(a) (2x + 1)/9 + (x + 2)/9 = 1 oe	**M1**
(a) 3x + 3 = 9 (correct clearing of the denominator)	**M1**
(a) x = 2 cao	**A1**

(a) Answer: x = 2

(b) 5/9 ft from part (a)	**B1**

(b) Answer: 5/9

Question 6

(a) 2p(1-p) = 0.48 oe	**M1**
(a) correct expansion and division by 2, $p - p^2 = 0.24$	**M1**
(a) $p^2 - p + 0.24 = 0$ cso, answer printed, all working shown	**A1**

(a) Answer: $p^2 - p + 0.24 = 0$ (shown)

(b) (p - 0.6)(p - 0.4) = 0 oe, or correct use of the quadratic formula	**M1**
(b) p = 0.6 or p = 0.4 (both values found)	**A1**
(b) p = 0.6 cao (selecting the root with p > 0.5)	**A1**

(b) Answer: p = 0.6

Question 7

(a) (3/n) x (2/(n-1)) = 1/15 oe	**M1**
(a) correct cross multiplication, 15 x 6 = n(n-1)	**M1**
(a) $n^2 - n - 90 = 0$ cso, answer printed, all working shown	**A1**

(a) Answer: $n^2 - n - 90 = 0$ (shown)

(b) (n - 10)(n + 9) = 0 oe, or correct use of the quadratic formula	**M1**
(b) n = 10 cao (rejecting n = -9 since n > 0)	**A1**

(b) Answer: n = 10

© Revision Library | revisionlibrary.co.uk