

Probability Equations

For Pearson Edexcel GCSE Mathematics (1MA1) • Higher tier

Name _____

Total marks: **31**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method.

- 1** A bag contains only red, blue and green counters.
number of red counters : number of blue counters : number of green counters = 2:3: x
A counter is taken at random from the bag.
The probability that the counter is blue is $\frac{1}{4}$
Find the value of x .

$x =$
(3)

(Total for Question 1 is 3 marks)

- 2** There are n pens in a box. 3 of the pens are red. The rest of the pens are black. Kim takes at random a pen from the box. She does not put the pen back. Kim then takes at random another pen from the box. The probability that Kim takes a black pen and then a red pen is $\frac{1}{4}$

(a) Show that $n^2 - 13n + 36 = 0$

(3)

- (b) There are more black pens than red pens in the box. Work out the number of black pens in the box.

.....
(2)

(Total for Question 2 is 5 marks)

- 3** There are 10 counters in a bag. There are only red counters and blue counters in the bag. x of the counters are red. Two counters are taken at random from the bag without replacement. The probability that the counters are different colours is $\frac{8}{15}$. Find the possible values of x . You must show all your working.

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(5)

(Total for Question 3 is 5 marks)

- 4 There are only lemon sweets and lime sweets in a jar.

The probability that a sweet taken at random from the jar is lime is $\frac{2}{5}$

Jo eats 5 of the lime sweets.

She then puts 3 more lemon sweets in the jar.

The probability that a sweet taken at random from the jar is now lime is $\frac{1}{4}$

How many sweets were in the jar at the start?

You must show all your working.

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(5)

(Total for Question 4 is 5 marks)

- 5** A plate has n chocolate cupcakes and 12 vanilla cupcakes.
There are no other cupcakes on the plate.
A cupcake is taken at random from the plate.

- (a) Lena says that the probability that the cupcake is chocolate is $\frac{3}{8}$
Show that Lena is wrong.

(3)

- (b) Two of the cupcakes are taken at random.
The probability that one cupcake is chocolate and the other is vanilla is $\frac{2}{5}$
There are fewer chocolate cupcakes than vanilla cupcakes.
Work out the number of chocolate cupcakes on the plate.
You must show all your working.

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(5)

(Total for Question 5 is 8 marks)

- 6** A tin contains x red buttons, $2x$ blue buttons and 3 green buttons.

Nadia takes at random two buttons from the tin.

Find, in terms of x , an expression for the probability that Nadia takes two buttons of different colours.

Give your answer as a single fraction in its simplest form.

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(5)

(Total for Question 6 is 5 marks)
