S158 Harder probability problems

Q1.

Nomusa has 30 sweets.

She has

18 fruit sweets
7 aniseed sweets
5 mint sweets

Nomusa is going to take at random two sweets.

Work out the probability that the two sweets will **not** be the same type of sweet.
You must show all your working.

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(Total for question = 4 marks)

Q2.

Carolyn has 20 biscuits in a tin.

She has

12 plain biscuits
5 chocolate biscuits
3 ginger biscuits

Carolyn takes at random two biscuits from the tin.

Work out the probability that the two biscuits were **not** the same type.

(Total for Question is 4 marks)

Q3.

There are only n red balls and $(n + 1)$ blue balls in a bag.

Shamsa takes at random 2 balls from the bag.

Show that the probability that both balls are the same colour is $\frac{n}{2n+1}$

(Total for question = 4 marks)

Q4.

There are 10 pens in a box.

There are x red pens in the box.
All the other pens are blue.

Jack takes at random two pens from the box.

Find an expression, in terms of x, for the probability that Jack takes one pen of each colour.
Give your answer in its simplest form.

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(Total for question is 5 marks)

Q5.

There are y black socks and 5 white socks in a drawer.

Joshua takes at random two socks from the drawer.

The probability that Joshua takes one white sock and one black sock is $\frac{6}{11}$

(a) Show that $3y^2 - 28y + 60 = 0$

(4)

(b) Find the probability that Joshua takes two black socks.

.....

(3)

(Total for question = 7 marks)

Q6.

There are only green pens and blue pens in a box.

There are three more blue pens than green pens in the box.
There are more than 12 pens in the box.

Simon is going to take at random two pens from the box.

The probability that Simon will take two pens of the same colour is $\frac{27}{55}$

Work out the number of green pens in the box.

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(Total for question = 6 marks)

Q7.

John has an empty box.
He puts some red counters and some blue counters into the box.

The ratio of the number of red counters to the number of blue counters is 1 : 4

Linda takes at random 2 counters from the box.

The probability that she takes 2 red counters is $\frac{6}{155}$

How many red counters did John put into the box?

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(Total for question = 4 marks)

Q8.

There are some red counters and some white counters in a bag.
At the start, 7 of the counters are red, the rest of the counters are white.

Alfie takes at random a counter from the bag.
He does not put the counter back in the bag.
Alfie then takes at random another counter from the bag.

The probability that the first counter Alfie takes is white **and** the second counter Alfie takes is red is $\frac{21}{80}$

Work out the number of white counters in the bag at the start.

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(Total for question = 5 marks)

Q9.

There are only *r* red counters and *g* green counters in a bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{3}{7}$

The counter is put back in the bag.

2 more red counters and 3 more green counters are put in the bag.
A counter is taken at random from the bag.

The probability that the counter is green is $\frac{6}{13}$

Find the number of red counters and the number of green counters that were in the bag originally.

red counters .....

green counters .....

(Total for question = 5 marks)

Q10.

There are six coins in a bag.
The value of each coin is shown below.

£2 £1 £1 50p 50p 50p

Laura takes at random a coin from the bag and keeps it.
Fahmida then takes at random a coin from the bag and keeps it.

Calculate the probability that Fahmida's coin has a greater value than Laura's coin.

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(Total for question = 3 marks)

Q11.

Here are 8 cards.

There is a number on each card.

Erin puts the 8 cards in a bag.
She takes at random a card from the bag and does not replace it.
Erin then takes at random a second card from the bag.

Calculate the probability that the number on the second card is double the number on the first card.

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(Total for question = 3 marks)

Q12.

Marek has 9 cards.
There is a number on each card.

Marek takes at random two of the cards.
He works out the product of the numbers on the two cards.

Work out the probability that the product is an even number.

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(Total for question = 3 marks)

Q13.

These 6 coins are in a box.

10p	10p	10p	20p	20p	50p

Pritesh takes at random 2 coins from the box.

Work out the probability that the total value of the 2 coins is at least 40p.

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(Total for question = 4 marks)

Q14.

There are 9 counters in a bag.

There is an even number on 3 of the counters.
There is an odd number on 6 of the counters.

Three counters are going to be taken at random from the bag.
The numbers on the counters will be added together to give the total.

Find the probability that the total is an odd number.

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(Total for question = 5 marks)