Edexcel GCSE
Mathematics (Linear) – 1MA0

PROBABILITY & TREE DIAGRAMS

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

Instructions

Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.
Keep an eye on the time.
Try to answer every question.
Check your answers if you have time at the end.

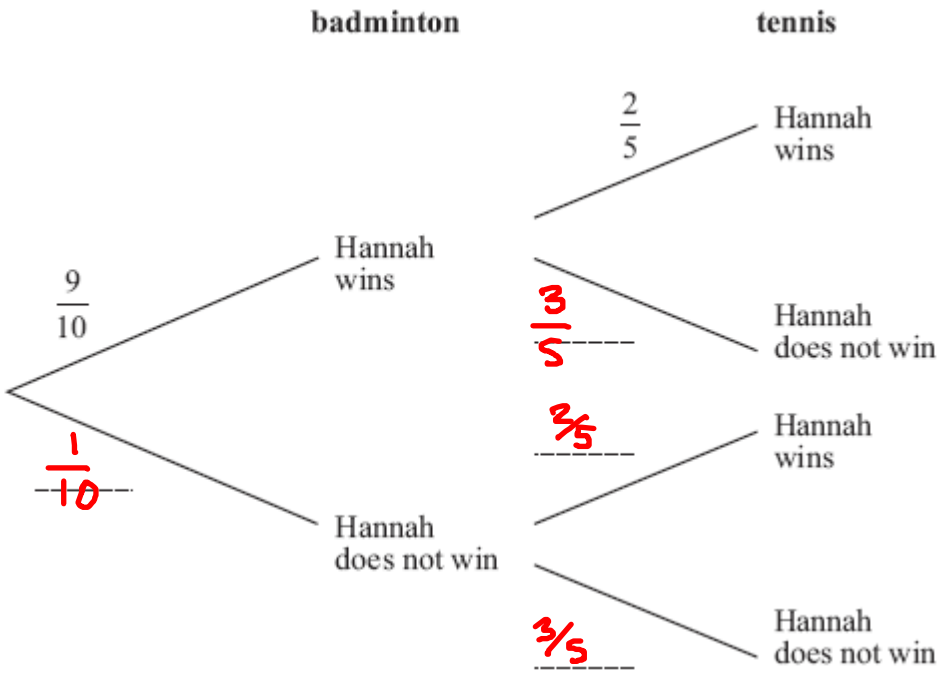
1. Hannah is going to play one badminton match and one tennis match.

The probability that she will win the badminton match is $\frac{9}{10}$

The probability that she will win the tennis match is $\frac{2}{5}$

(a) Complete the probability tree diagram.

(2)



(b) Work out the probability that Hannah will win **both** matches.

(2)

$P(W,W) = \frac{9}{10} \times \frac{2}{5} = \frac{18}{50}$

$\frac{18}{50}$

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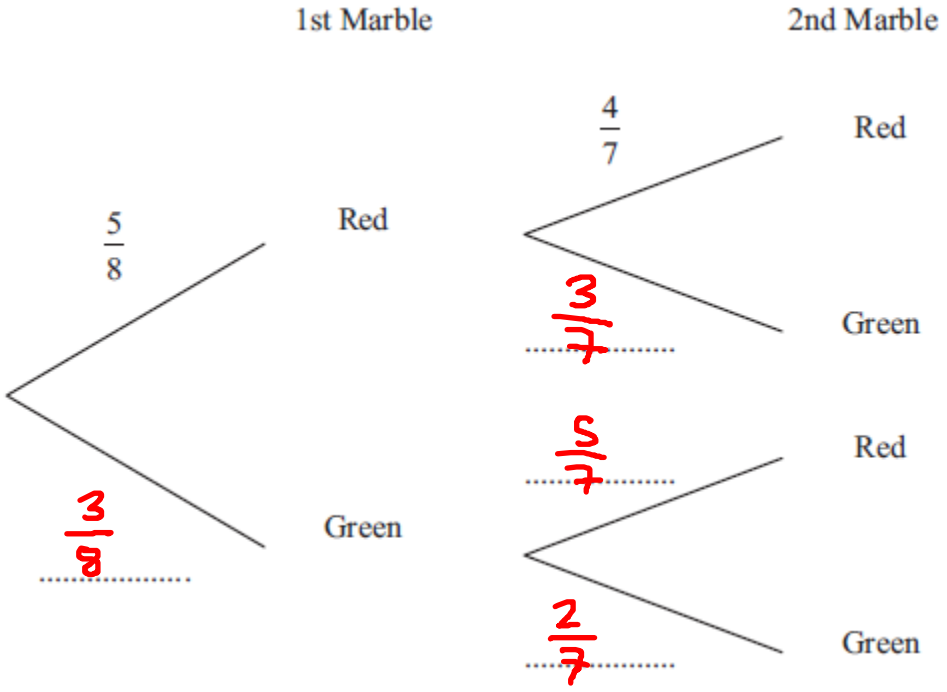
(4 marks)

2. There are only red marbles and green marbles in a bag.
There are 5 red marbles and 3 green marbles.

Dwayne takes at random a marble from the bag.
He does not put the marble back in the bag.

Dwayne takes at random a second marble from the bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Dwayne takes marbles of different colours.

$P(R,G) = \frac{5}{8} \times \frac{3}{7} = \frac{15}{56}$

$P(G,R) = \frac{3}{8} \times \frac{5}{7} = \frac{15}{56}$

$P(\text{diff colours}) = \frac{15}{56} + \frac{15}{56} = \frac{30}{56}$

$\frac{30}{56}$

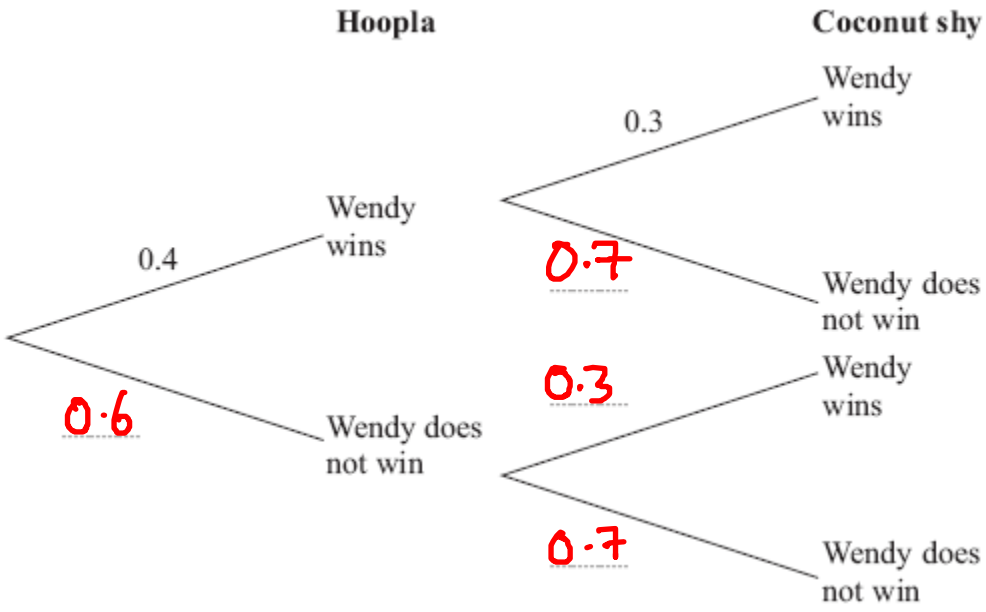
(3)

(5 marks)

3. Wendy goes to a fun fair.
She has one go at Hoopla.
She has one go on the Coconut shy.

The probability that she wins at Hoopla is 0.4
The probability that she wins on the Coconut shy is 0.3

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Wendy wins at Hoopla and also wins on the Coconut shy.

$P(W,W) = 0.4 \times 0.3 = 0.12$

0.12

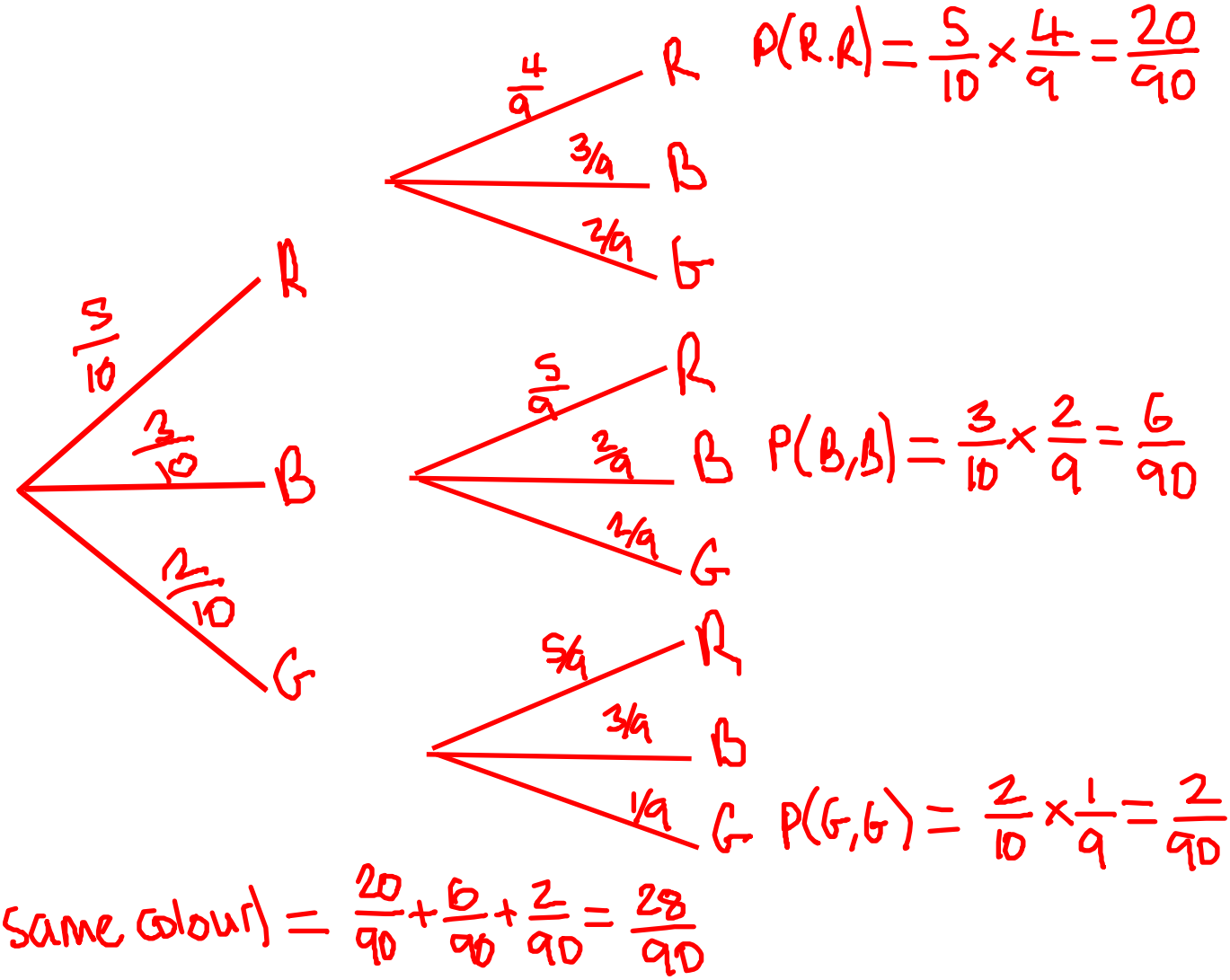
(2)

(4 marks)

4. There are 5 red pens, 3 blue pens and 2 green pens in a box.

Gary takes at random a pen from the box and gives the pen to his friend.
Gary then takes at random another pen from the box.

Work out the probability that both pens are the same colour.



28/90

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(4 marks)

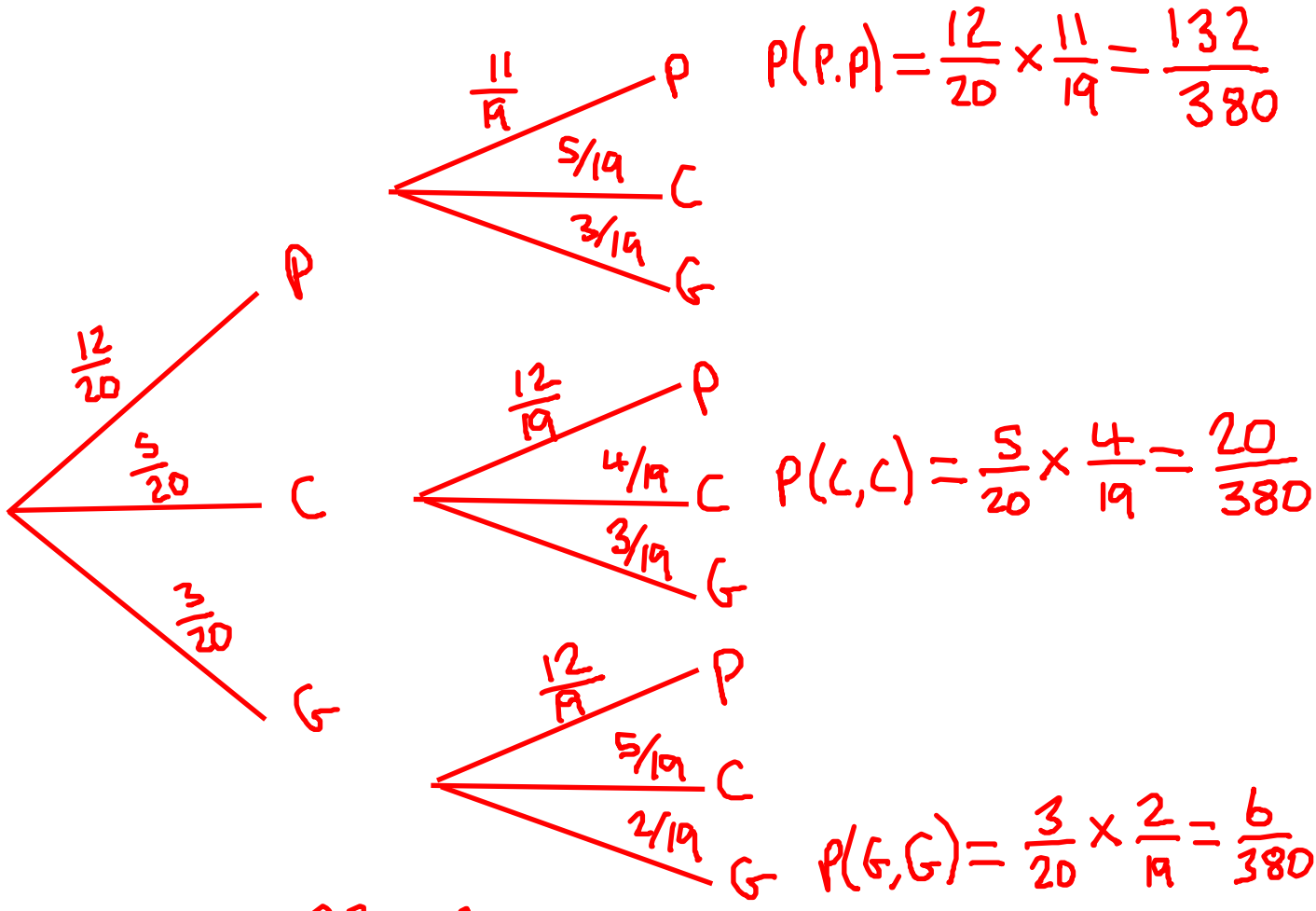
5. Carolyn has 20 biscuits in a tin.

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.



$P(\text{same}) = \frac{132}{380} + \frac{20}{380} + \frac{6}{380} = \frac{158}{380}$

$P(\text{diff}) = 1 - P(\text{same})$

$P(\text{diff}) = 1 - \frac{158}{380} = \frac{222}{380}$

$\frac{222}{380}$

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(4 marks)

6. Here are seven tiles.

Jim takes at random a tile.
He does **not** replace the tile.

Jim then takes at random a second tile.

(a) Calculate the probability that both the tiles Jim takes have the number 1 on them.

$\frac{2}{7} \times \frac{1}{6} = \frac{2}{42}$

$\frac{2}{42}$

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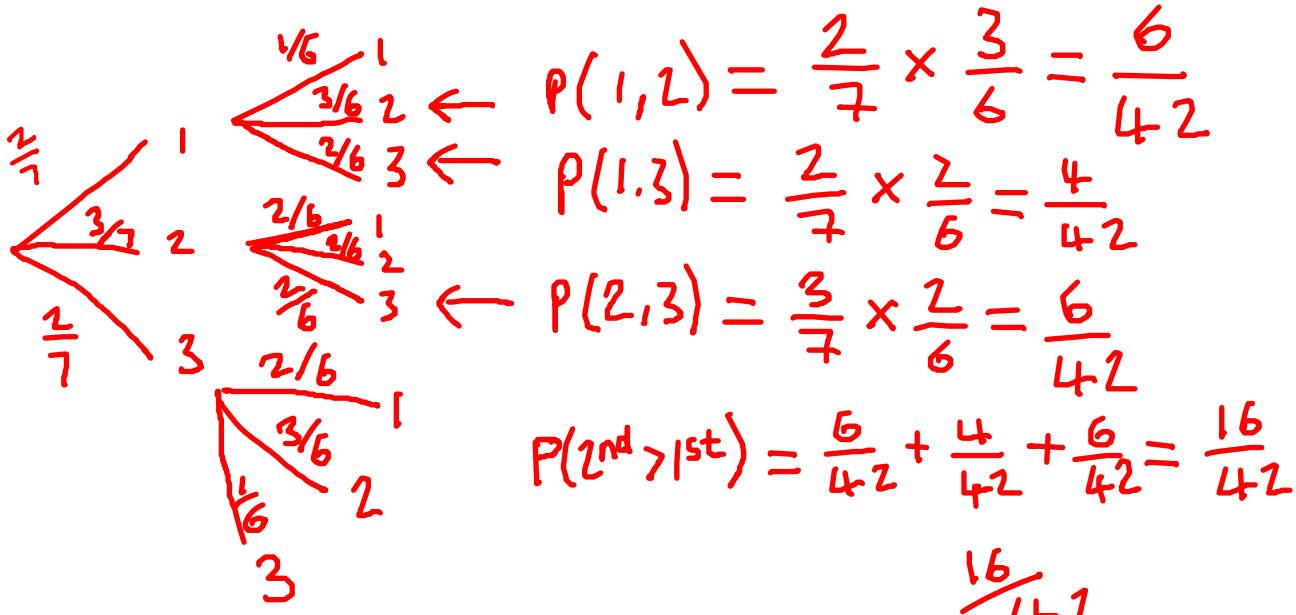
(2)

(b) Calculate the probability that the number on the second tile Jim takes is greater than the number on the first tile he takes.



$\frac{16}{42}$

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(3)

(5 marks)

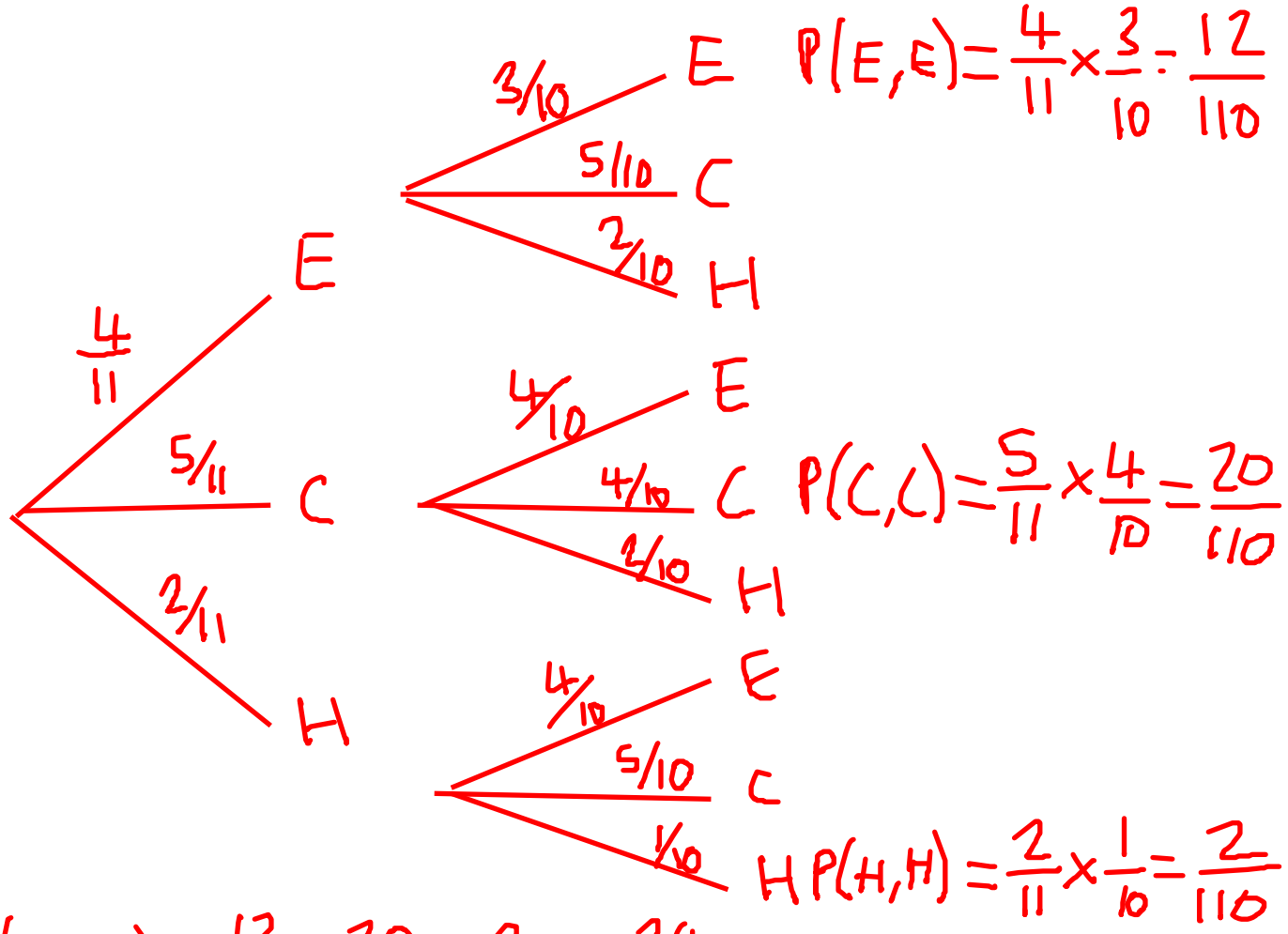
7. There are three different types of sandwiches on a shelf.

There are

4 egg sandwiches,
5 cheese sandwiches
and 2 ham sandwiches.

Erin takes at random 2 of these sandwiches.

Work out the probability that she takes 2 different types of sandwiches.



$P(\text{same}) = \frac{12}{110} + \frac{20}{110} + \frac{2}{110} = \frac{34}{110}$

$P(\text{diff}) = 1 - P(\text{same})$

$P(\text{diff}) = 1 - \frac{34}{110} = \frac{76}{110}$

$\frac{76}{110}$

(5 marks)