



Name: _____

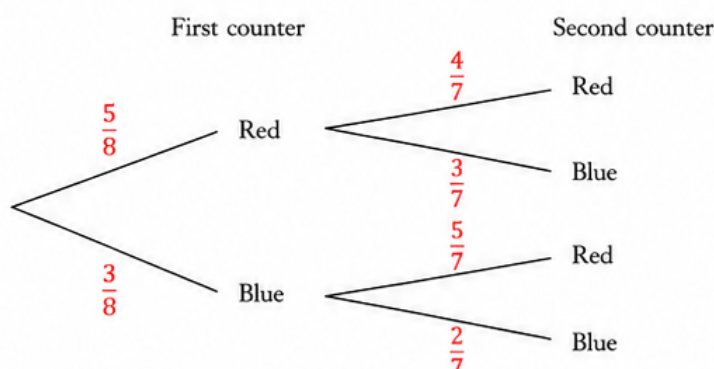
Date: _____

Higher Only

6. A bag contains 5 red counters and 3 blue counters. Two counters are taken without replacement.

(a) Draw a probability tree diagram to represent this information.

(2)



(b) Find the probability that at most one counter is red.

(3)

$$P(\text{at most one red}) = P(\text{no red}) + P(\text{one red})$$

$$= \left(\frac{3}{8} \times \frac{2}{7}\right) + \left(\frac{5}{8} \times \frac{3}{7} + \frac{3}{8} \times \frac{5}{7}\right)$$

$$= \frac{6}{56} + \frac{30}{56} = \frac{36}{56} = \frac{9}{14}$$

$$\frac{9}{14}$$

(Total for Question 6 is 5 marks)

Higher Only

7. A bag contains red counters and 4 blue counters. Two counters are taken at random without replacement. The probability that both counters are red is $\frac{x}{3}$.

(a) Show that

$$x^2 - 5x - 6 = 0$$

(3)

Let the number of red counters be x .

Total counters = $x + 4$.

$$P(\text{both red}) = \frac{x}{x+4} \times \frac{x-1}{x+3} = \frac{x}{3}$$

$$3x(x-1) = x(x+4)(x+3)$$

$$3x^2 - 3x = x(x^2 + 7x + 12)$$

$$3x^2 - 3x = x^3 + 7x^2 + 12x$$

$$0 = x^3 + 7x^2 + 12x - 3x^2 + 3x$$

$$0 = x^3 + 4x^2 + 15x$$

$$0 = x(x^2 + 4x + 15)$$

Since $x > 0$, divide by x :

$$x^2 + 4x + 15 = 0$$

$$x^2 - 5x - 6 = 0$$

(b) Work out the number of red counters originally in the bag.

(2)

$$(x-6)(x+1) = 0$$

$$x = 6 \text{ or } x = -1$$

$$\text{Number of red counters} = 6$$

$$6$$

(Total for Question 7 is 5 marks)



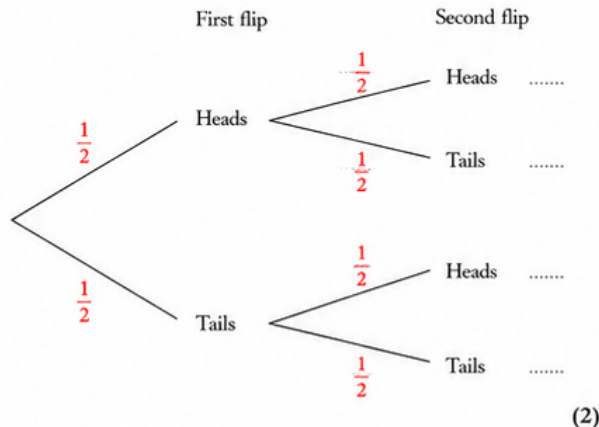


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1. A fair coin is flipped twice.

(a) Complete the probability tree diagram



(b) Find the probability of getting exactly one head.

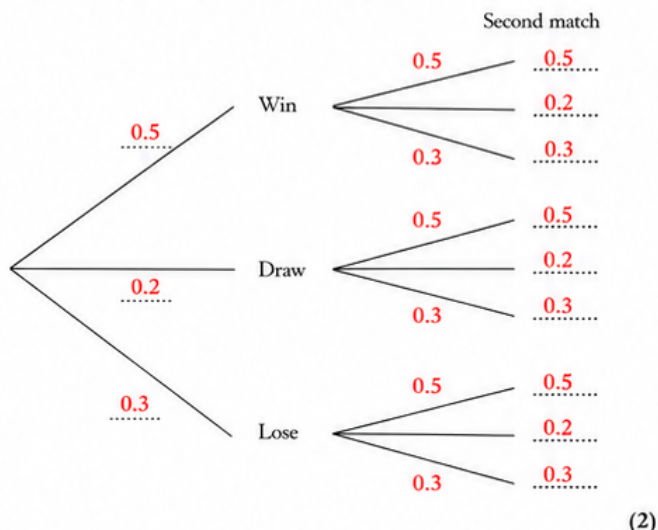
$\frac{1}{2}$

(3)

(Total for Question 1 is 5 marks)

2. A football team plays two matches. For each match, the probability of winning is 0.5 and the probability of drawing is 0.2.

(a) Complete the probability tree diagram



(b) Find the probability that the team wins exactly one match.

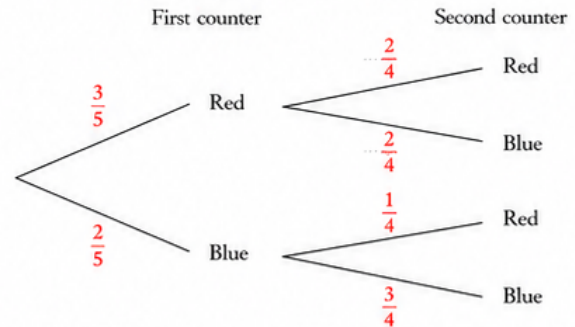
0.3

(3)

(Total for Question 2 is 5 marks)



3. A bag contains 3 red and 2 blue counters. The two counters are taken without replacement. Below is the tree diagram.



Write down two things that are wrong with the tree diagram.

1. The probabilities on the second set of branches are incorrect.

2. The probabilities on each set of branches do not add to 1.

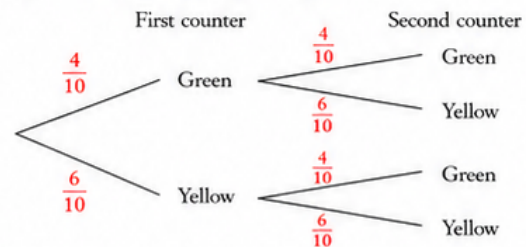
(2)

(Total for Question 3 is 2 marks)

4. A bag contains 4 green counters and 6 yellow counters. A counter is taken at random. The colour is recorded and the counter is replaced. A second counter is then taken.

(a) Draw a probability tree diagram

(3)



(b) Find the probability that both counters are the same colour.

0.52

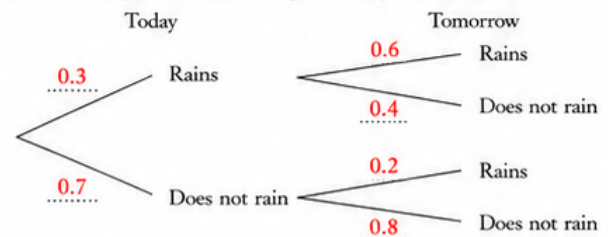
(2)

(Total for Question 4 is 5 marks)

5. The probability that it rains today is 0.3. If it rains today, the probability that it rains tomorrow is 0.6. If it does not rain today, the probability that it rains tomorrow is 0.2.

(a) Draw a probability tree diagram to represent this information.

(3)



(b) Find the probability that it rains tomorrow.

0.38

(2)

(Total for Question 5 is 5 marks)

