

1. There are 12 counters in a bag.  
 There is an equal number of red counters, blue counters and yellow counters in the bag.  
 There are no other counters in the bag.
- 3 counters are taken at random from the bag.
- (a) Work out the probability of taking 3 red counters.

4 red counters

$$\frac{4}{12} \times \frac{3}{11} \times \frac{2}{10} \checkmark$$

$$= \frac{1}{55}$$

$$\frac{1}{55} \checkmark$$

(2)

The 3 counters are put back into the bag.

Some more counters are now put into the bag.

There is still an equal number of red counters, blue counters and yellow counters in the bag.  
 There are no counters of any other colour in the bag.

3 counters are taken at random from the bag.

- (b) Is it now less likely or equally likely or more likely that the 3 counters will be red?  
 You must show how you get your answer.

Probability from part a)

$$= \frac{1}{55} = 0.018$$

4 × 2 = 8 red counters  
 12 × 2 = 24 counters in total

$$\frac{8}{24} \times \frac{7}{23} \times \frac{6}{22} \checkmark$$

$$= \frac{7}{253}$$

$$= 0.028$$

It is now more likely that 3 counters will be red because  
 0.018 < 0.028 ✓

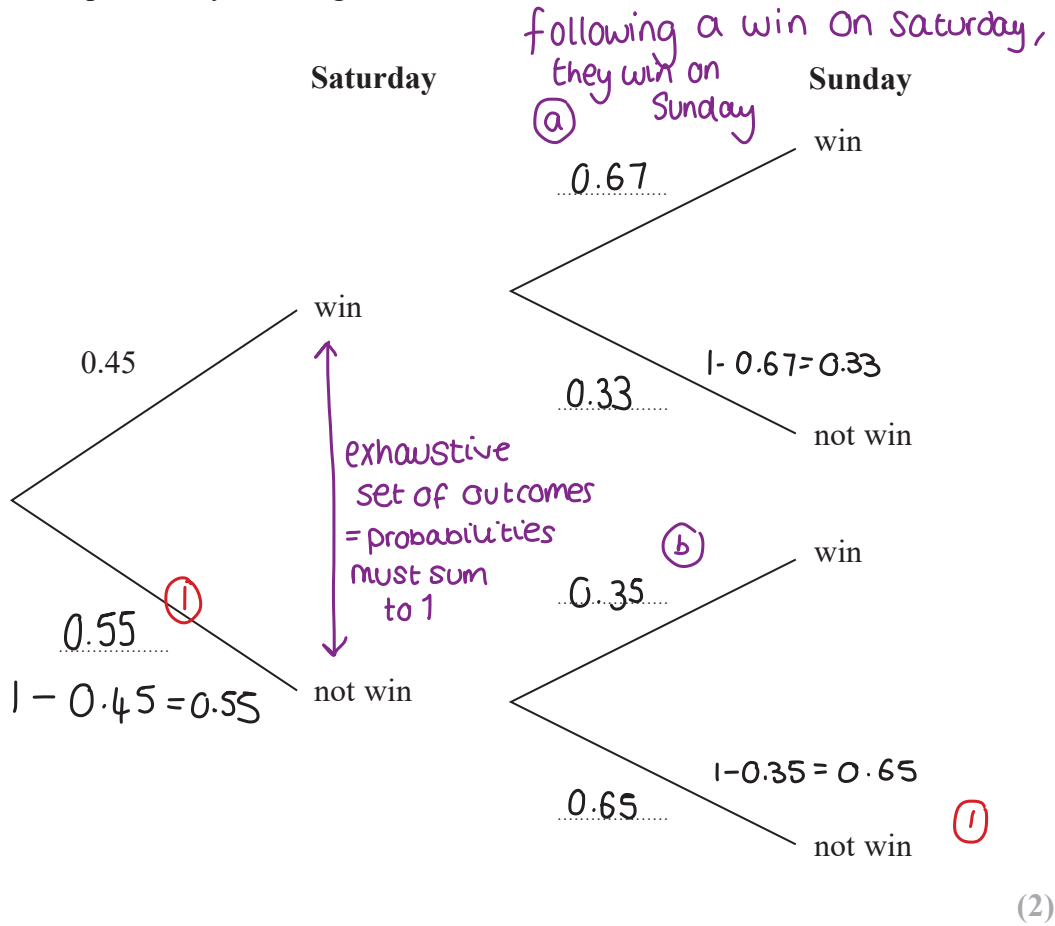
(2)

(Total for Question is 4 marks)

2. A darts team is going to play a match on Saturday and on Sunday.  
 The probability that the team will win on Saturday is 0.45

If they win on Saturday, the probability that they will win on Sunday is 0.67 (a)  
 If they do not win on Saturday, the probability that they will win on Sunday is 0.35 (b)

(a) Complete the probability tree diagram.



- (b) Find the probability that the team will win exactly one of the two matches.

Working across (horizontally) tree diagram, so we multiply probabilities.

$$P(\text{win on sat, lose on sun}) = 0.45 \times 0.33 = 0.1485 \text{ (1)}$$

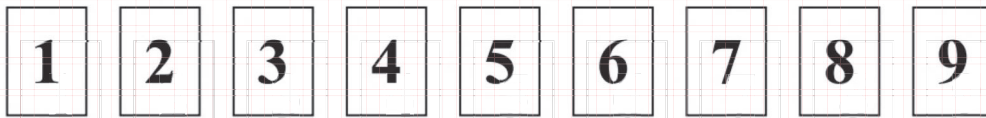
$$P(\text{lose on sat, win on sun}) = 0.55 \times 0.35 = 0.1925$$

$$\begin{aligned} \text{Total probability} &= 0.1485 + 0.1925 \text{ (1)} \\ &= 0.3410 \end{aligned}$$

$$0.341 \text{ (1)}$$

(3)

3. 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.

odd x odd = odd

odd x even = even

even x even = even

For 'And' use x

For 'Or' use +

even and even

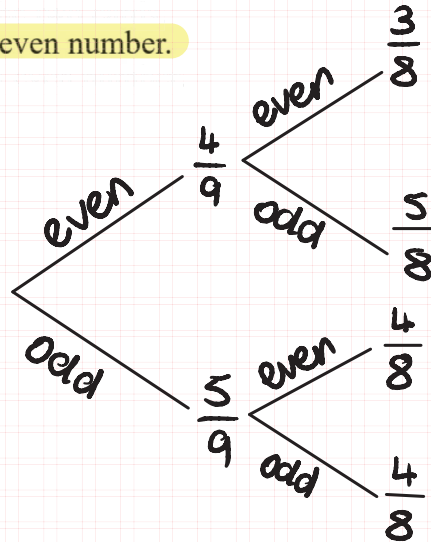
$$\frac{4}{9} \times \frac{3}{8} = \frac{1}{6}$$

odd and even

$$\frac{5}{9} \times \frac{4}{8} = \frac{5}{18}$$

even and odd

$$\frac{4}{9} \times \frac{5}{8} = \frac{5}{18}$$



$$\frac{1}{6} + \frac{5}{18} + \frac{5}{18} = \frac{13}{18}$$

'OR' the possibilities

$$\frac{13}{18}$$