

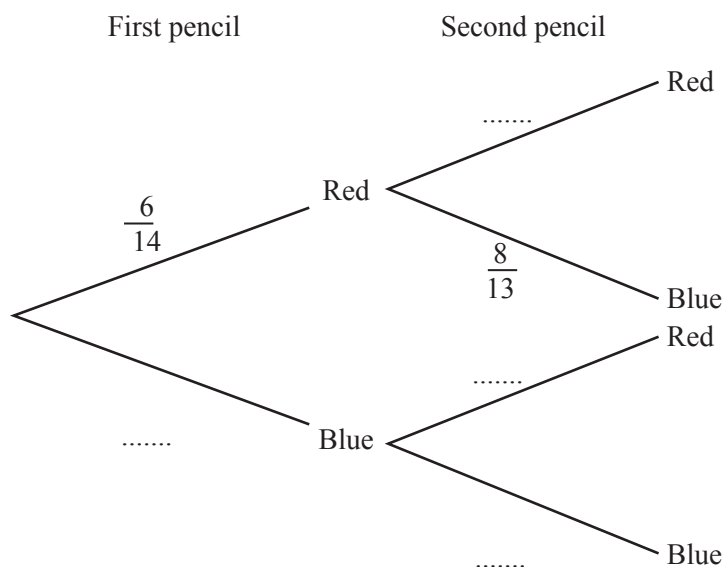
# Probability Tree Diagrams



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- 23** A box contains 6 red pencils and 8 blue pencils.  
A pencil is chosen at random and not replaced.  
A second pencil is then chosen at random.

**(a)** Complete the tree diagram.



[2]

**(b)** Calculate the probability that

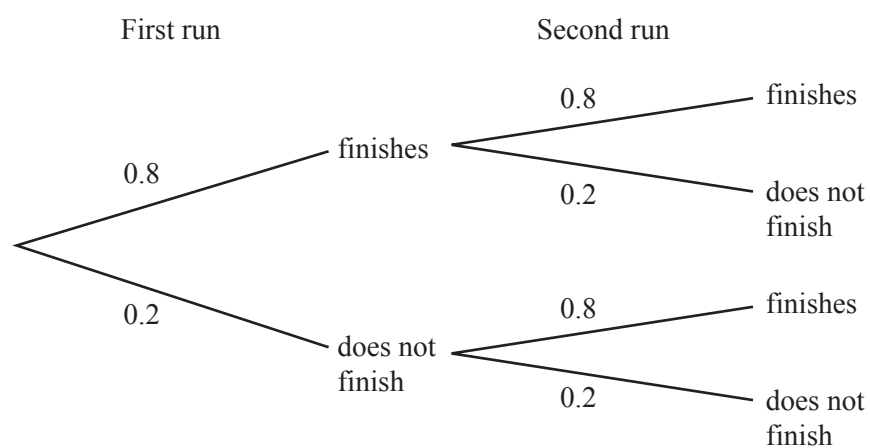
**(i)** both pencils are red,

*Answer(b)(i)* ..... [2]

**(ii)** at least one of the pencils is red.

*Answer(b)(ii)* ..... [3]

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- 18** Samira takes part in two charity runs.  
The probability that she finishes each run is 0.8 .

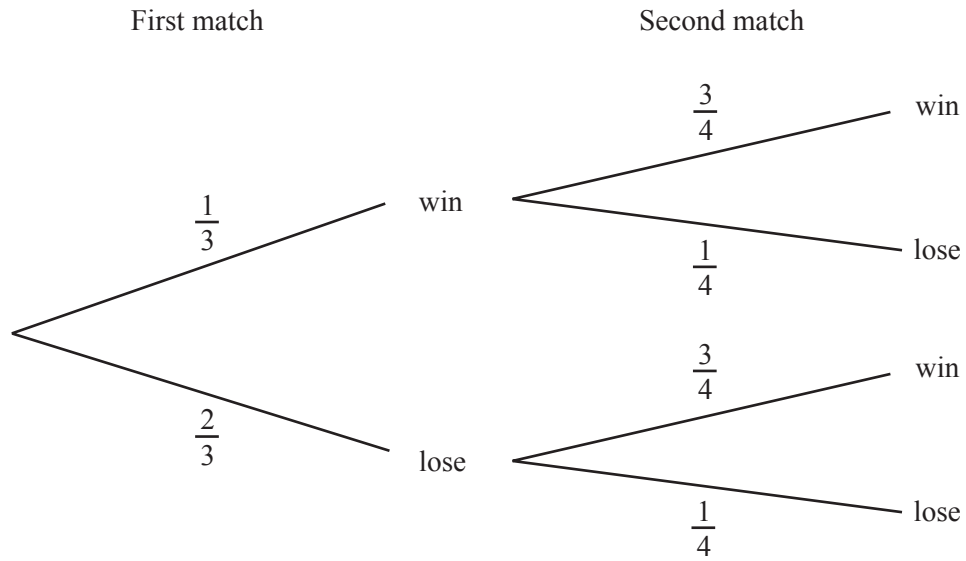


Find the probability that Samira finishes at least one run.

*Answer* ..... [3]

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- 19 The probability of a cricket team winning or losing in their first two matches is shown in the tree diagram.

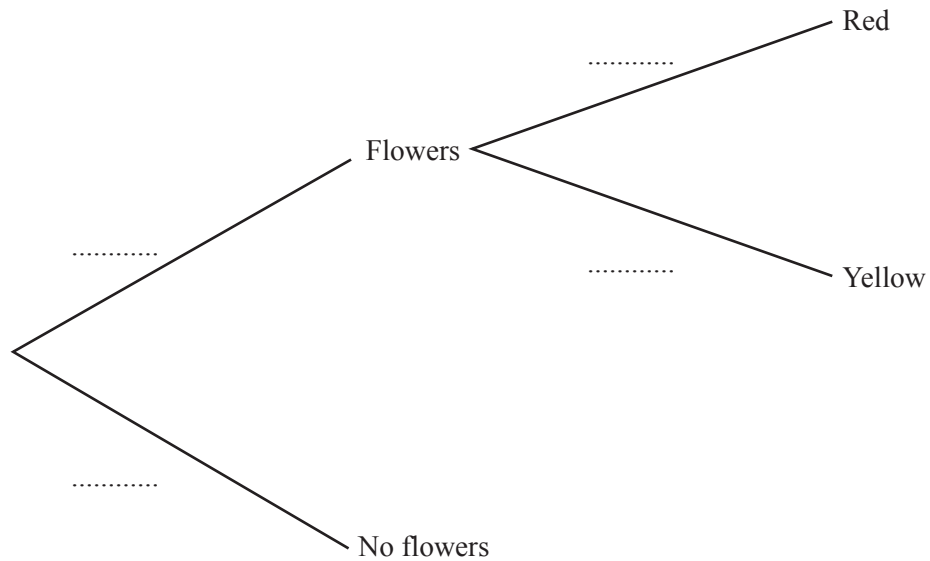


Find the probability that the cricket team wins at least one match.

..... [3]

- 5 The probability that a plant will produce flowers is  $\frac{7}{8}$ .  
 The flowers are either red or yellow.  
 If the plant produces flowers, the probability that the flowers are red is  $\frac{3}{4}$ .

(a) (i) Complete the tree diagram by writing a probability beside each branch.



[2]

- (ii) Calculate the probability that a plant, chosen at random, will produce red flowers.

..... [2]

- (iii) Two plants are chosen at random.

Calculate the probability that both will produce red flowers.

..... [2]

- (b) Alphonse buys 200 of these plants.

Calculate the number of plants that are expected to produce flowers.

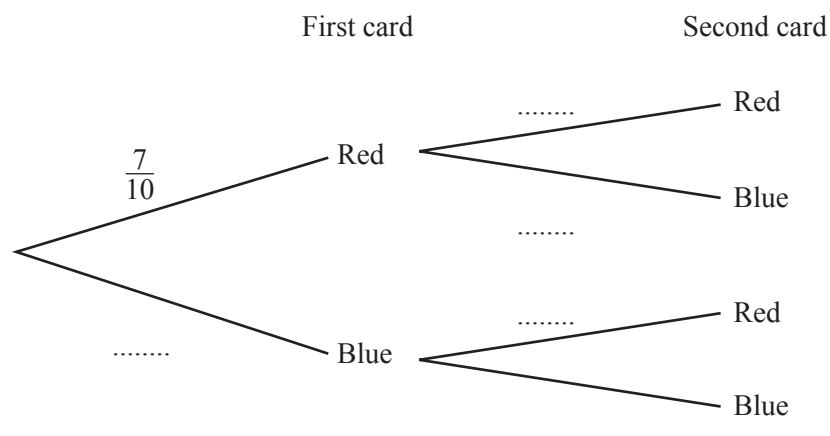
..... [2]

- (c) Gabriel has 1575 plants with red flowers.

Estimate the total number of plants that Gabriel has.

..... [2]

- (a) Complete this tree diagram.



**(b)** Work out the probability that the two cards are of different colours.  
Give your answer as a fraction.

*Answer(b)* ..... [3]

**8 In all parts of this question give your answer as a fraction in its lowest terms.**

- (a) (i)** The probability that it will rain today is  $\frac{1}{3}$ .

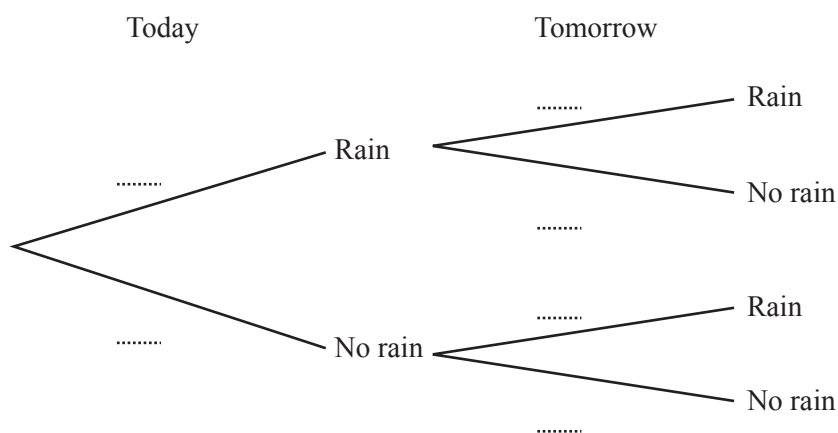
What is the probability that it will not rain today?

Answer(a)(i) ..... [1]

- (ii)** If it rains today, the probability that it will rain tomorrow is  $\frac{2}{5}$ .

If it does not rain today, the probability that it will rain tomorrow is  $\frac{1}{6}$ .

Complete the tree diagram.



[2]

- (b)** Find the probability that it will rain on at least one of these two days.

Answer(b) ..... [3]

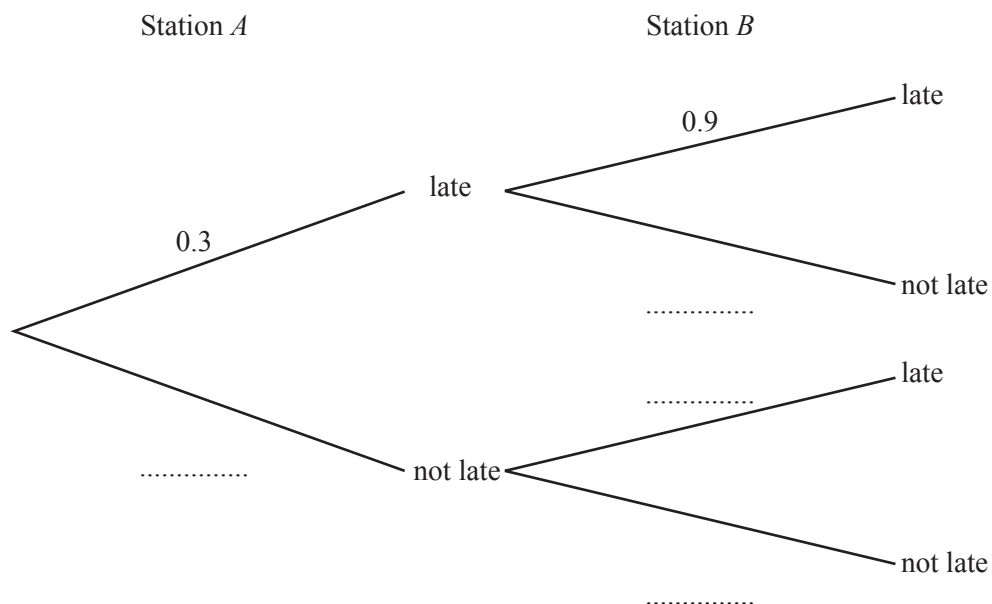
- (c)** Find the probability that it will rain on only one of these two days.

Answer(c) ..... [3]



- 7 A train stops at station  $A$  and then at station  $B$ .  
 If the train is late at station  $A$ , the probability that it is late at station  $B$  is  $0.9$ .  
 If the train is not late at station  $A$ , the probability that it is late at station  $B$  is  $0.2$ .  
 The probability that the train is late at station  $A$  is  $0.3$ .

(a) Complete the tree diagram.



[2]

- (b) (i) Find the probability that the train is late at one or both of the stations.

..... [3]

- (ii) This train makes 250 journeys.

Find the number of journeys that the train is expected to be late at one or both of the stations.

..... [1]

- (c) The train continues to station  $C$ .  
 The probability that it is late at all 3 stations is  $0.27$ .

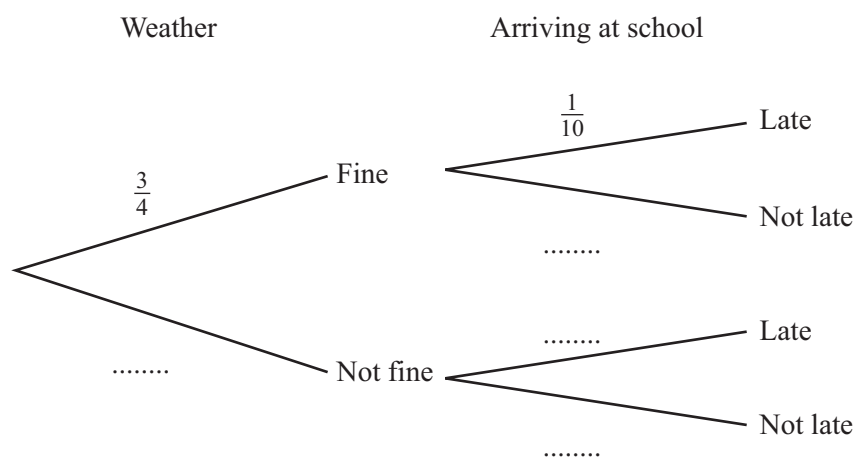
Describe briefly what this probability shows.

.....

..... [1]

- 9 If the weather is fine the probability that Carlos is late arriving at school is  $\frac{1}{10}$ .  
 If the weather is not fine the probability that he is late arriving at school is  $\frac{1}{3}$ .  
 The probability that the weather is fine on any day is  $\frac{3}{4}$ .

(a) Complete the tree diagram to show this information.



[3]

- (b) In a school term of 60 days, find the number of days the weather is expected to be fine.

Answer(b) ..... [1]

- (c) Find the probability that the weather is fine and Carlos is late arriving at school.

Answer(c) ..... [2]

- (d) Find the probability that Carlos is not late arriving at school.

Answer(d) ..... [3]

- (e) Find the probability that the weather is not fine on at least one day in a school week of 5 days.

Answer(e) ..... [2]

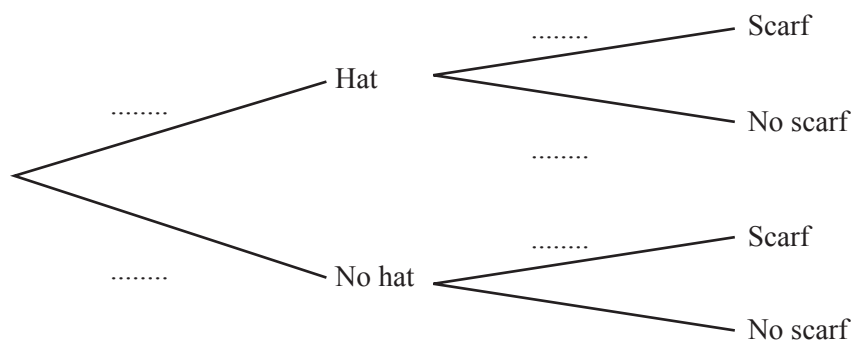
**8 In this question, give all your answers as fractions.**

When Ivan goes to school in winter, the probability that he wears a hat is  $\frac{5}{8}$ .

If he wears a hat, the probability that he wears a scarf is  $\frac{2}{3}$ .

If he does not wear a hat, the probability that he wears a scarf is  $\frac{1}{6}$ .

**(a)** Complete the tree diagram.



[3]

**(b)** Find the probability that Ivan

**(i)** does not wear a hat and does not wear a scarf,

*Answer(b)(i)* ..... [2]

**(ii)** wears a hat but does not wear a scarf,

*Answer(b)(ii)* ..... [2]

**(iii)** wears a hat or a scarf but not both.

*Answer(b)(iii)* ..... [2]

**(c)** If Ivan wears a hat and a scarf, the probability that he wears gloves is  $\frac{7}{10}$ .

Calculate the probability that Ivan does **not** wear all three of hat, scarf and gloves.

*Answer(c)* ..... [3]

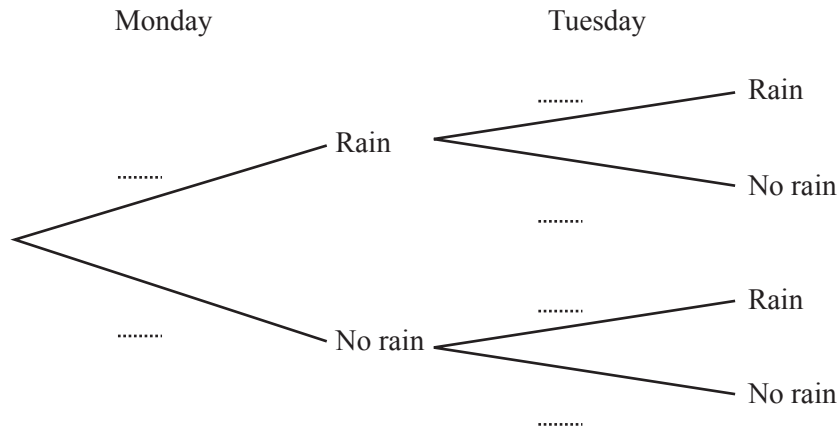
**2 In this question give all your answers as fractions.**

The probability that it rains on Monday is  $\frac{3}{5}$ .

If it rains on Monday, the probability that it rains on Tuesday is  $\frac{4}{7}$ .

If it does not rain on Monday, the probability that it rains on Tuesday is  $\frac{5}{7}$ .

(a) Complete the tree diagram.



[3]

(b) Find the probability that it rains

(i) on **both** days,

Answer(b)(i) ..... [2]

(ii) on Monday but not on Tuesday,

Answer(b)(ii) ..... [2]

(iii) on **only one** of the two days.

Answer(b)(iii) ..... [2]

(c) If it does **not** rain on Monday and it does **not** rain on Tuesday, the probability that it does **not** rain on Wednesday is  $\frac{1}{4}$ .

Calculate the probability that it rains on **at least one** of the three days.

Answer(c) ..... [3]

- 4 Yeung and Ariven compete in a triathlon race.

The probability that Yeung finishes this race is  $\frac{3}{5}$ .

The probability that Ariven finishes this race is  $\frac{2}{3}$ .

- (a) (i) Which of them is more likely to finish this race?  
Give a reason for your answer.

*Answer(a)(i)* ..... because .....

..... [1]

- (ii) Find the probability that they both finish this race.

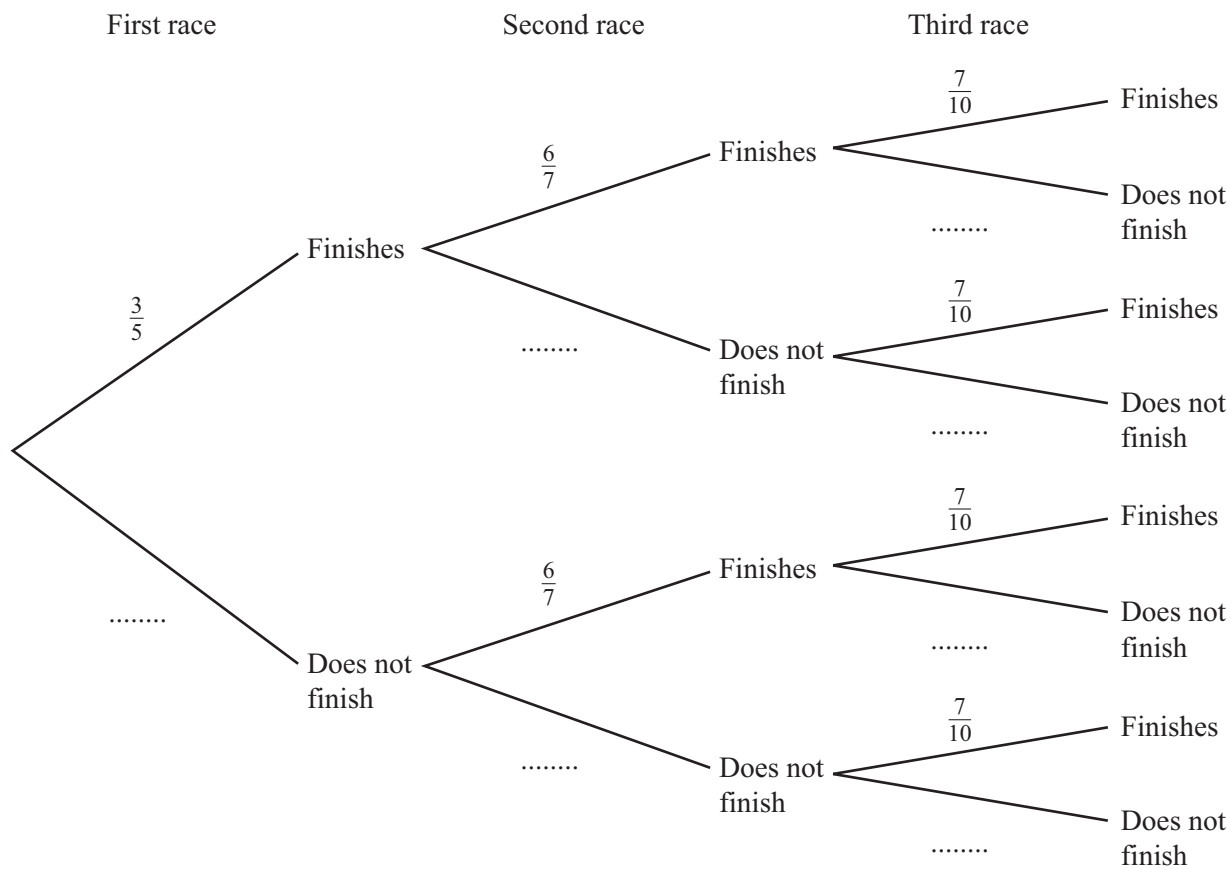
*Answer(a)(ii)* ..... [2]

- (iii) Find the probability that only one of them finishes this race.

*Answer(a)(iii)* ..... [3]

(b) After the first race, **Yeung** competes in two further triathlon races.

(i) Complete the tree diagram.



[3]

(ii) Calculate the probability that Yeung finishes all three of his races.

*Answer(b)(ii)* ..... [2]

(iii) Calculate the probability that Yeung finishes at least one of his races.

*Answer(b)(iii)* ..... [3]