

Probability

Q1

On a randomly chosen day the probability that Bill travels to school by car, by bicycle or on foot is $\frac{1}{2}$, $\frac{1}{6}$ and $\frac{1}{3}$ respectively. The probability of being late when using these methods of travel is $\frac{1}{5}$, $\frac{2}{5}$ and $\frac{1}{10}$ respectively.

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

(3)

(b) Find the probability that on a randomly chosen day

(i) Bill travels by foot and is late,

(ii) Bill is not late.

(4)

Q2

A jar contains 2 red, 1 blue and 1 green bead. Two beads are drawn at random from the jar without replacement.

(a) In the space below, draw a tree diagram to illustrate all the possible outcomes and associated probabilities. State your probabilities clearly.

(3)

(b) Find the probability that a blue bead and a green bead are drawn from the jar.

(2)

Q3

In a company the 200 employees are classified as full-time workers, part-time workers or contractors.

	Walk	Transport
Full-time worker	2	8
Part-time worker	35	75
Contractor	30	50

The events F , H and C are that an employee is a full-time worker, part-time worker or contractor respectively. Let W be the event that an employee walks to work.

An employee is selected at random.

Find

(a) $P(H)$

(2) (b) $P([F \cap W]')$

(2)

Q4

The bag P contains 6 balls of which 3 are red and 3 are yellow.

The bag Q contains 7 balls of which 4 are red and 3 are yellow.

A ball is drawn at random from bag P and placed in bag Q . A second ball is drawn at random from bag P and placed in bag Q .

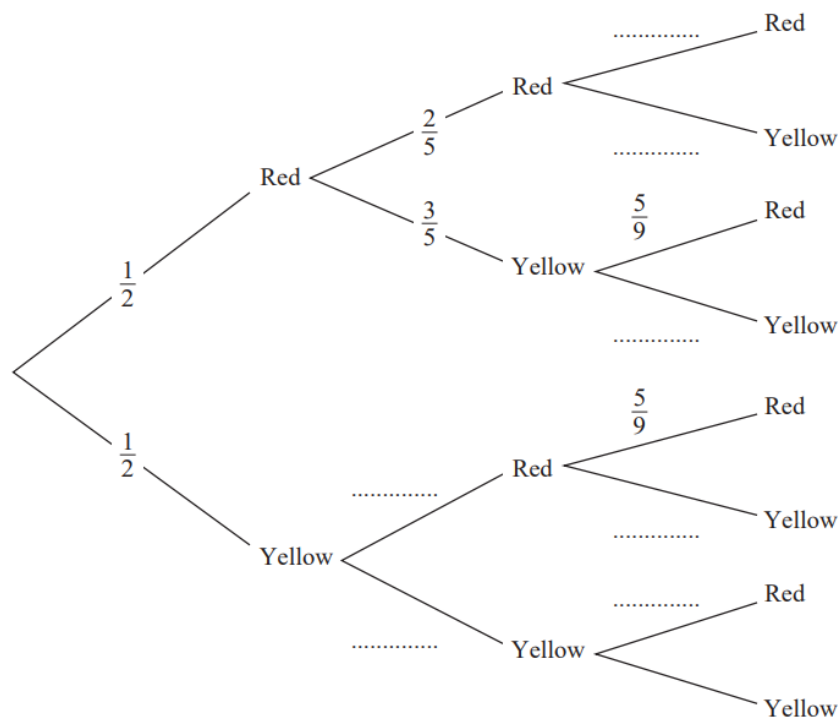
A third ball is then drawn at random from the 9 balls in bag Q .

The event A occurs when the 2 balls drawn from bag P are of the same colour.

The event B occurs when the ball drawn from bag Q is red.

(a) Complete the tree diagram shown below.

(4)



(b) Find $P(A)$

(3)

(c) Show that $P(B) = \frac{5}{9}$

(3)

(d) Show that $P(A \cap B) = \frac{2}{9}$

(2)

(e) Hence find $P(A \cup B)$

(2)

Q5

Two bags, **A** and **B**, each contain balls which are either red or yellow or green.

Bag **A** contains 4 red, 3 yellow and n green balls.

Bag **B** contains 5 red, 3 yellow and 1 green ball.

A ball is selected at random from bag **A** and placed into bag **B**.

A ball is then selected at random from bag **B** and placed into bag **A**.

The probability that bag **A** now contains an equal number of red, yellow and green balls is p .

Given that $p > 0$, find the possible values of n and p .

(5)

Q6

A factory buys 10% of its components from supplier A , 30% from supplier B and the rest from supplier C . It is known that 6% of the components it buys are faulty.

Of the components bought from supplier A , 9% are faulty and of the components bought from supplier B , 3% are faulty.

(a) Find the percentage of components bought from supplier C that are faulty.

(3)
