3 There are only red counters, blue counters, green counters and yellow counters in a bag.

The table shows the probabilities of picking at random a red counter and picking at random a yellow counter.

Colour	red	blue	green	yellow
Probability	0.24	0·22	0·22	0.32

0.24
0.32 +
0.56

1 − 0.56
= 0.44

0.44
2
= 0.22

The probability of picking a blue counter is the same as the probability of picking a green counter.

Complete the table.

(Total for Question 3 is 2 marks)

If a counter is picked then replaced 250 times how many yellows would be expected? (Estimate)

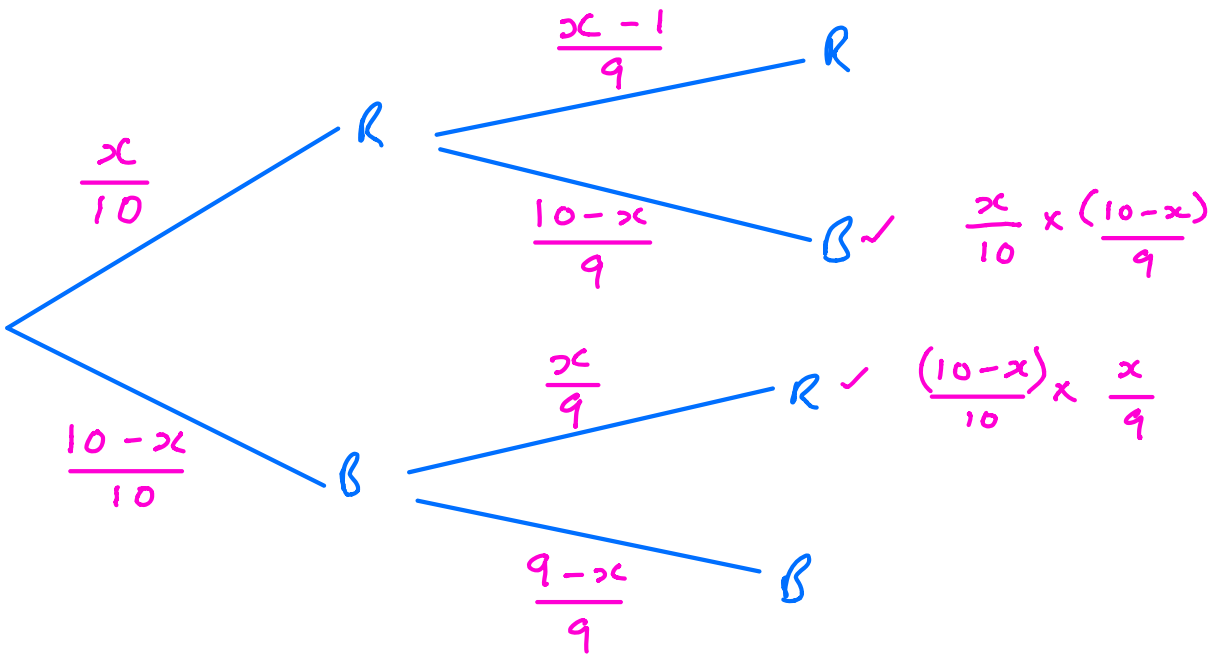
250 x 0.32 = 80

21 There are 10 pens in a box.

There are x red pens in the box.
All the other pens are blue. 10 − x

Jack takes at random two pens from the box.

Find an expression, in terms of x, for the probability that Jack takes one pen of each colour.
Give your answer in its simplest form.



$$\text{Prob (1 of each)} = \frac{10x - x^2}{90} + \frac{10x - x^2}{90}$$

$$= \frac{2(10x - x^2)}{90} = \frac{10x - x^2}{45}$$

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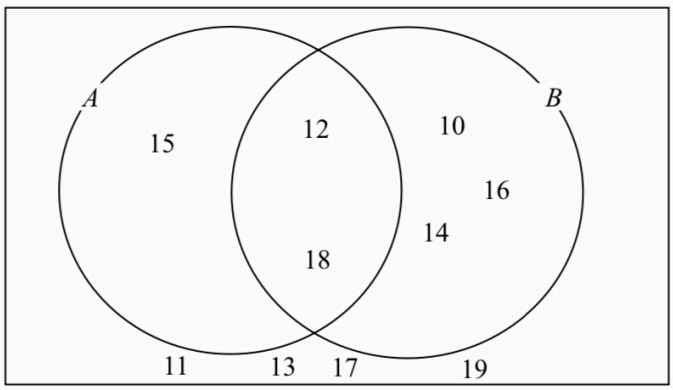
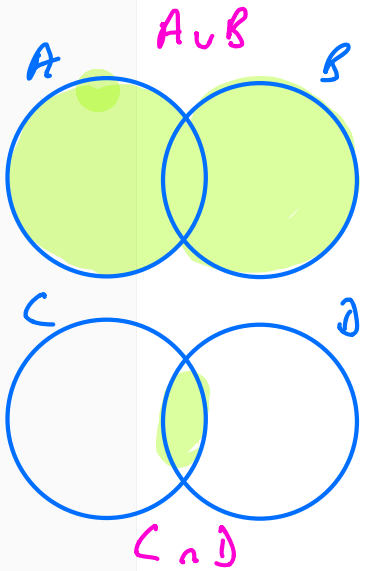
5 Here is a Venn diagram.





(a) Write down the numbers that are in set

(i) $A \cup B$

15, 12, 18, 10, 14, 16

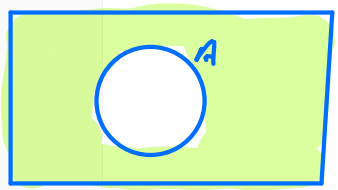
(ii) $A \cap B$

12, 18

(2)

One of the numbers in the diagram is chosen at random.

(b) Find the probability that the number is in set A' A complement



$P(\text{in } A') = \frac{7}{10}$

(2)

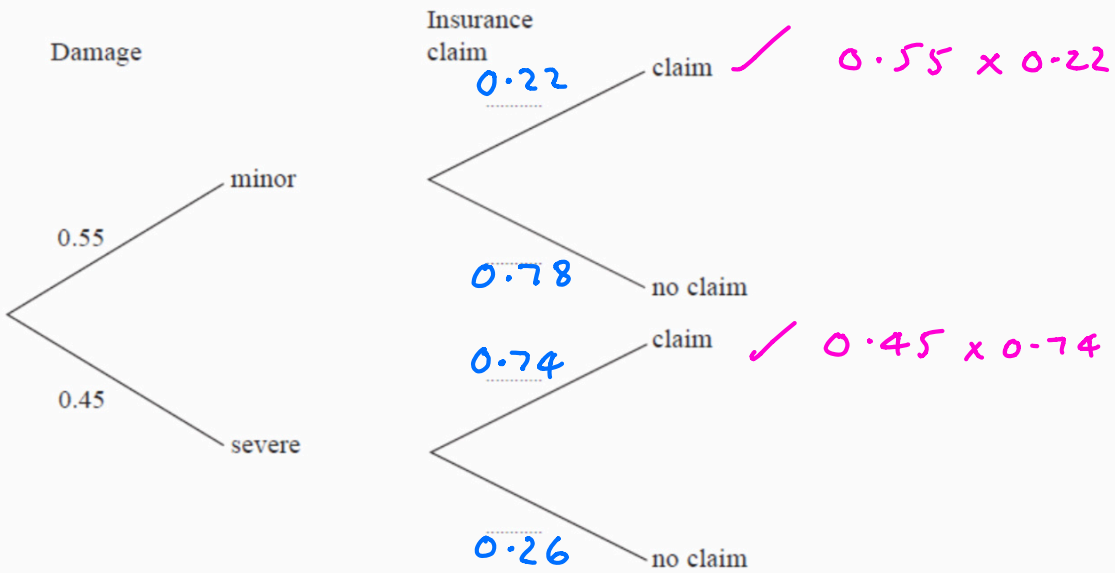
(Total for Question 5 is 4 marks)

7. When a water pipe bursts the water can cause damage.
The damage can be minor or severe.

The probability of minor damage is 0.55
The probability of severe damage is 0.45

Insurance claims can be made for the damage.

When the damage is minor, the probability that an insurance claim is made is 0.22
When the damage is severe, the probability that an insurance claim is made is 0.74



(a) Complete the decision tree diagram.

(2)

The insurance company uses the information in the decision tree diagram to decide whether they need to increase their charges for insurance.

If the probability that insurance claims for damage will be made is greater than 50%, the insurance company will increase their charges for insurance.

(b) Will the insurance company increase their charges?

$P(\text{claim}) = 0.55 \times 0.22 + 0.45 \times 0.74$

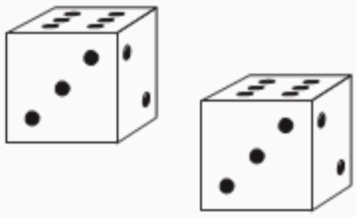
$= 0.454 < 50\%$

So no increase in charges

(4)

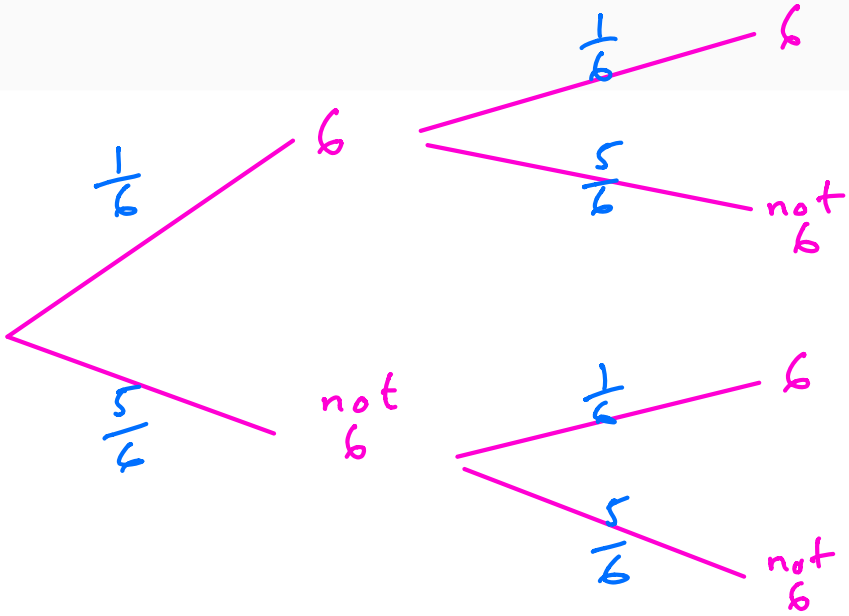
(Total 6 marks)

4. Naomi is playing a board game.
She must throw two fair dice.



She must get a 6 on each dice to start the game.

Work out the probability that she will not start the game on her first throw.



P(not start) = 1 − P(start)

= 1 − 1/36 = 35/36

7. (*a*) $A = \{p, r, a, g, u, e\}$

$B = \{p, a, r, i, s\}$

$C = \{b, u, d, a, p, e, s, t\}$

List the members of the set

(i) $A \cap B$

p, a, r

.....

(ii) $B \cup C$

p, a, r, i, s, b, u, d, e, t

.....

(2)

(*b*) $D = \{r, o, m, e\}$

$E = \{l, i, s, b, o, n\}$

$F = \{b, e, r, l, i, n\}$

Put one of the letters *D*, *E* or *F* in the box below to make the statement correct.

$A \cap$ [E] $= \emptyset$ = empty set

Explain your answer. no element in common

.....

(1)

(Total 3 marks)

2. There are 50 counters in a bag.

The counters are blue or yellow or black or white.
A counter is taken at random from the bag.

The table shows each of the probabilities that the counter will be blue or black or white.

Colour	blue	yellow	black	white
Probability	0.4	0.14	0.3	0.16

Work out the number of yellow counters in the bag.

0.4
0.3
0.16
0.86

1 − 0.86 = 0.14

50 × 0.14 = 7

7

.....

(Total 4 marks)