

5. A bag contains 10 red balls, 10 green balls and 6 white balls. Two balls are drawn at random from the bag without replacement. What is the probability that they are of different colours?

<p><i>Working:</i></p> 	<p><i>Answer:</i></p> <p>.....</p>
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(Total 4 marks)

6. A box contains 22 red apples and 3 green apples. Three apples are selected at random, one after the other, without replacement.
- (a) The first two apples are green. What is the probability that the third apple is red?
- (b) What is the probability that exactly two of the three apples are red?

<p><i>Working:</i></p> 	<p><i>Answers:</i></p> <p>(a)</p> <p>(b)</p>
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(Total 6 marks)

7. For the events A and B , $p(A) = 0.6$, $p(B) = 0.8$ and $p(A \cup B) = 1$.

Find

- (a) $p(A \cap B)$;
- (b) $p(\complement A \cup \complement B)$.

<p><i>Working:</i></p> 	<p><i>Answers:</i></p> <p>(a)</p> <p>(b)</p>
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(Total 4 marks)

8. Two fair dice are thrown and the number showing on each is noted. The sum of these two numbers is S . Find the probability that
- (a) S is less than 8; (2)
 - (b) at least one die shows a 3; (2)
 - (c) at least one die shows a 3, given that S is less than 8. (3)

(Total 7 marks)

9. Dumisani is a student at IB World College.

The probability that he will be woken by his alarm clock is $\frac{7}{8}$.

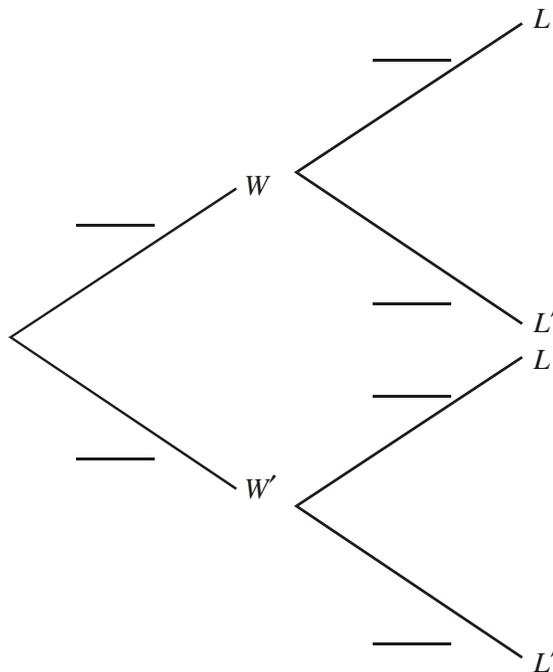
If he is woken by his alarm clock the probability he will be late for school is $\frac{1}{4}$.

If he is not woken by his alarm clock the probability he will be late for school is $\frac{3}{5}$.

Let W be the event “Dumisani is woken by his alarm clock”.

Let L be the event “Dumisani is late for school”.

- (a) Copy and complete the tree diagram below.



(4)

- (b) Calculate the probability that Dumisani will be late for school. (3)

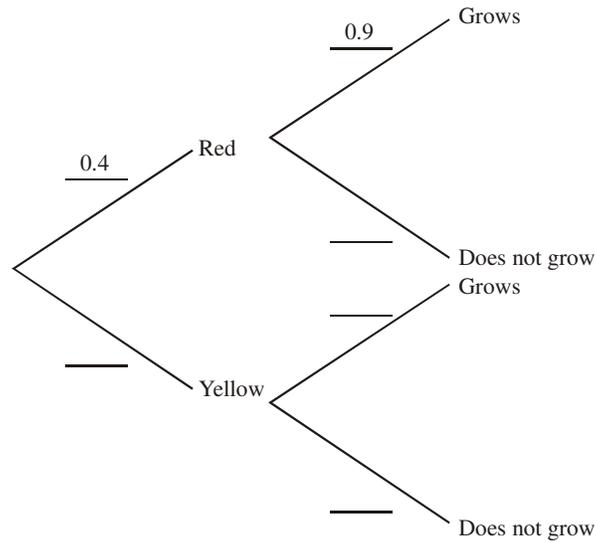
- (c) Given that Dumisani is late for school what is the probability that he was woken by his alarm clock?

(4)

(Total 11 marks)

10. A packet of seeds contains 40% red seeds and 60% yellow seeds. The probability that a red seed grows is 0.9, and that a yellow seed grows is 0.8. A seed is chosen at random from the packet.

(a) Complete the probability tree diagram below.

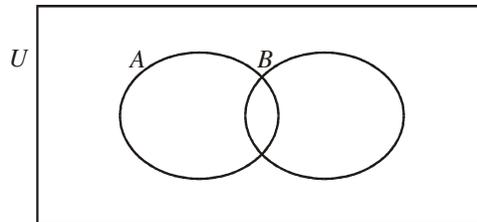


(3)

- (b) (i) Calculate the probability that the chosen seed is red and grows.
- (ii) Calculate the probability that the chosen seed grows.
- (iii) Given that the seed grows, calculate the probability that it is red.

(7) (Total 10 marks)

11. The following Venn diagram shows a sample space U and events A and B .



$n(U) = 36, n(A) = 11, n(B) = 6$ and $n(A \cup B)' = 21$.

- (a) On the diagram, shade the region $(A \cup B)'$.
- (b) Find
 - (i) $n(A \cap B)$;
 - (ii) $P(A \cap B)$.
- (c) Explain why events A and B are not mutually exclusive.

Working:

Answers:

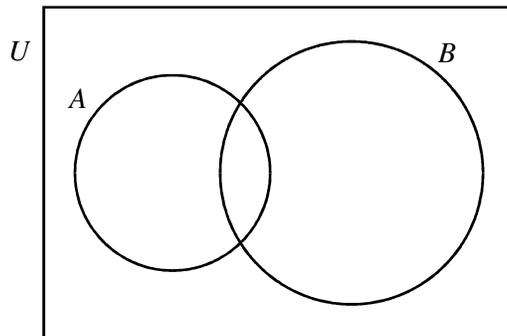
(b) (i)

(ii)

(c)

(Total 4 marks)

12. The following Venn diagram shows the universal set U and the sets A and B .



- (a) Shade the area in the diagram which represents the set $B \cap A'$.
 $n(U) = 100$, $n(A) = 30$, $n(B) = 50$, $n(A \cup B) = 65$.
- (b) Find $n(B \cap A')$.
- (c) An element is selected at random from U . What is the probability that this element is in $B \cap A'$?

Working:

Answers:

(b)

(c)

(Total 4 marks)

13. Consider events A, B such that $P(A) \neq 0$, $P(A) \neq 1$, $P(B) \neq 0$, and $P(B) \neq 1$. In each of the situations (a), (b), (c) below state whether A and B are mutually exclusive (M); independent (I); neither (N).

- (a) $P(A|B) = P(A)$
- (b) $P(A \cap B) = 0$
- (c) $P(A \cap B) = P(A)$

Working:

Answers:

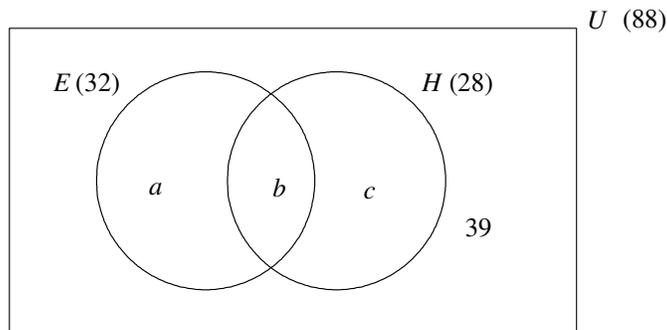
(a)

(b)

(c)

(Total 6 marks)

14. In a school of 88 boys, 32 study economics (E), 28 study history (H) and 39 do not study either subject. This information is represented in the following Venn diagram.



- (a) Calculate the values a , b , c . (4)
- (b) A student is selected at random.
- (i) Calculate the probability that he studies **both** economics and history.
- (ii) Given that he studies economics, calculate the probability that he does **not** study history. (3)
- (c) A group of three students is selected at random from the school.
- (i) Calculate the probability that none of these students studies economics.
- (ii) Calculate the probability that at least one of these students studies economics. (5)

(Total 12 marks)

15. Let A and B be events such that $P(A) = \frac{1}{2}$, $P(B) = \frac{3}{4}$ and $P(A \cup B) = \frac{7}{8}$.

- (a) Calculate $P(A \cap B)$.
- (b) Calculate $P(A | B)$.
- (c) Are the events A and B independent? Give a reason for your answer.

Working:

Answers:

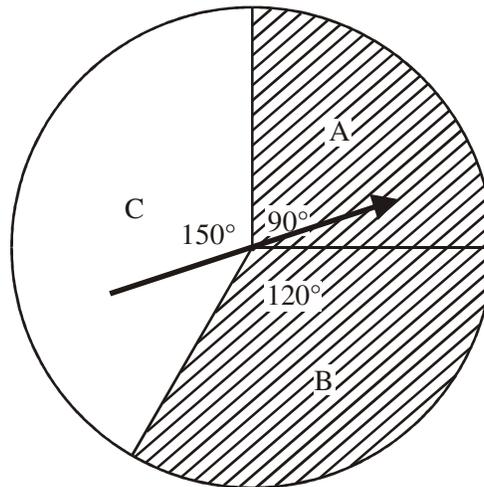
(a)

(b)

(c)

(Total 6 marks)

16. The following diagram shows a circle divided into three sectors A, B and C. The angles at the centre of the circle are 90° , 120° and 150° . Sectors A and B are shaded as shown.



The arrow is spun. It cannot land on the lines between the sectors. Let A , B , C and S be the events defined by

- A : Arrow lands in sector A
- B : Arrow lands in sector B
- C : Arrow lands in sector C
- S : Arrow lands in a shaded region.

Find

- (a) $P(B)$;
- (b) $P(S)$;
- (c) $P(A|S)$.

Working:

Answers:

- (a)
- (b)
- (c)

(Total 6 marks)