

GCSE Maths: Sets and Venn diagrams (Foundation): worksheet

GCSE Maths - Probability - Foundation - Lesson 23.7

Name: _____

Date: _____

Score: _____

17 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch23-probability/foundation/sets-and-venn-diagrams/

Exercise 23I Sets and Venn diagrams Non-calculator

1 $\xi = \{1, 2, 3, \dots, 12\}$, $A = \{\text{odd numbers}\}$ and $B = \{\text{prime numbers}\}$. List the elements of...

(a) A

Answer:

(b) B

Answer:

(c) $A \cap B$

Answer:

(d) $A \cup B$

Answer:

(e) A'

Answer:

(f) $(A \cup B)'$

Answer:

2 Complete each statement with $\in$ or $\notin$. $A = \{2, 3, 5, 7, 11\}$.

(a) $3 \dots A$

Answer:

(b) $4 \dots A$

Answer:

(c) $11 \dots A$

Answer:

(d) $9 \dots A$

Answer:

3 $A = \{1, 2, 3, 4, 5, 6\}$ and $B = \{4, 5, 6, 7, 8\}$, and $\xi = \{1, 2, \dots, 9\}$. Work out...

(a) $n(A)$

Answer:

(b) $n(A \cap B)$

Answer:

(c) $n(A \cup B)$

Answer:

(d) $n((A \cup B)')$

Answer:

4 For each question, draw a Venn diagram with two circles, A and B, and write the number in each region.

(a) 30 students. 18 play football (A), 12 play swimming (B) and 5 do both.

Answer:

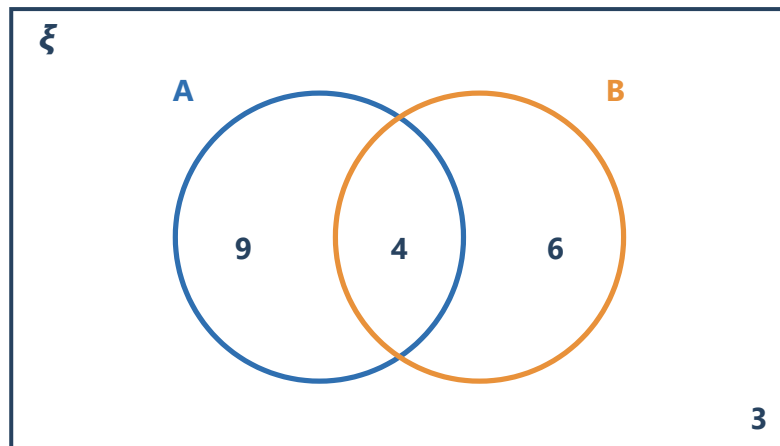
(b) 40 people. 25 own a cat (A), 17 own a dog (B) and 6 own both.

Answer:

(c) 50 students. 28 study French (A), 25 study Spanish (B) and 10 study both.

Answer:

5 Use the Venn diagram to find...



(a) A

Answer:

(b) $A \cap B$

Answer:

(c) $A \cup B$

Answer:

(d) A'

Answer:

(e) $A \cap B'$

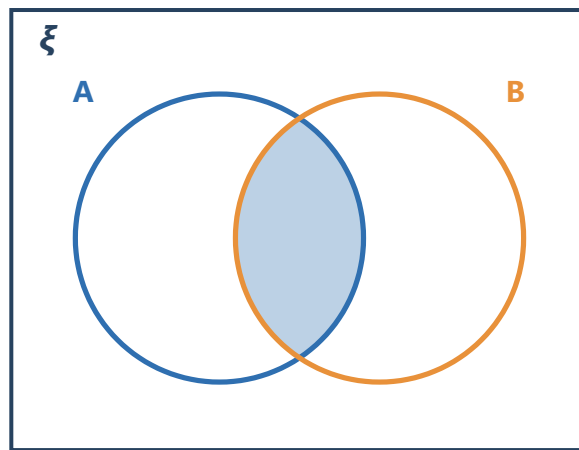
Answer:

(f) $(A \cup B)'$

Answer:

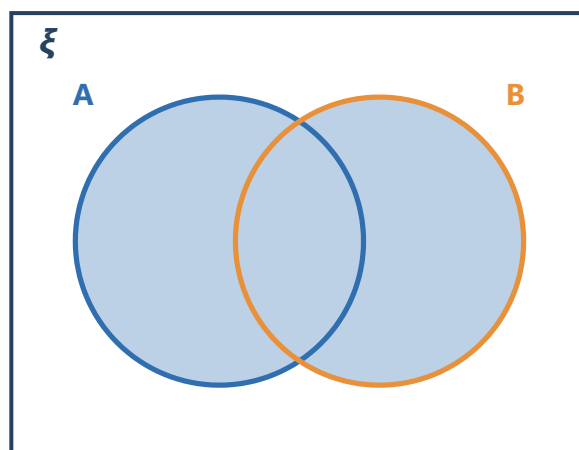
6 Describe the shaded region using set notation.

(a)



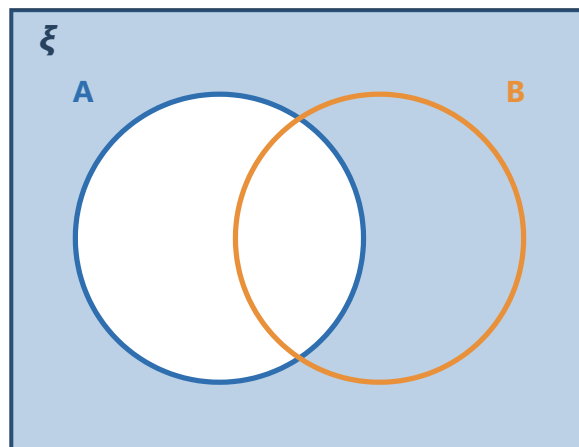
Answer:

(b)



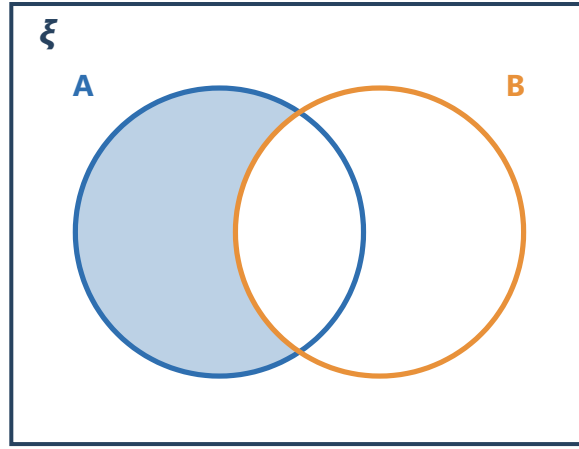
Answer:

(c)



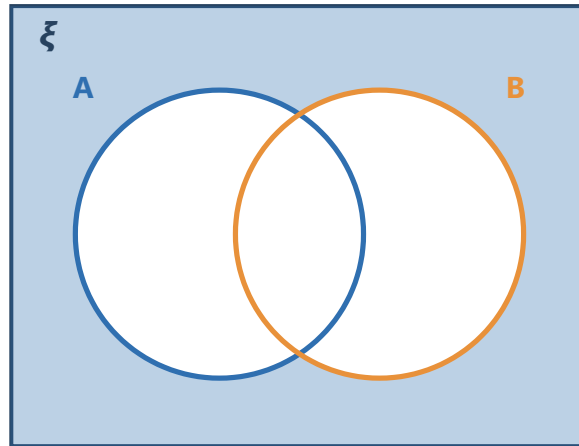
Answer:

(d)



Answer:

(e)



Answer:

7 Draw a two-circle Venn diagram for each statement and say what $A \cap B$ means.

Answer:

8 A and B are two sets. Explain what $A \cap B = \emptyset$ tells you about A and B. Give an example.

Answer:

9 In a class of 28 students, 15 have brothers (B) and 12 have sisters (S). 7 have both. Work out how many students have neither a brother nor a sister.

Answer:

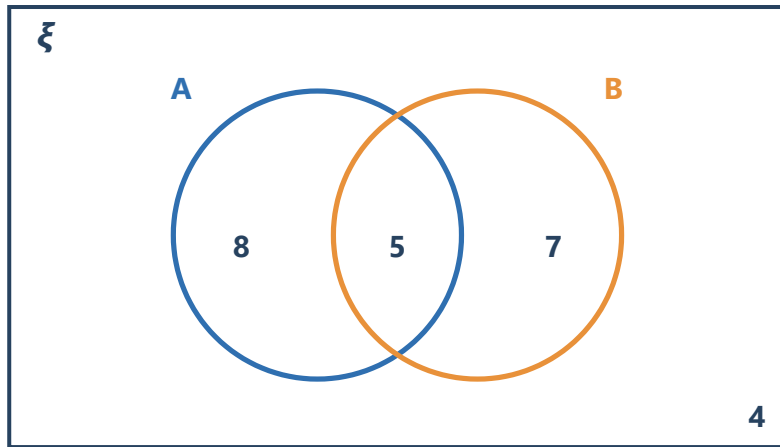
10 A and B are sets with $n(A) = 14$, $n(B) = 9$ and $n(A \cap B) = 4$. Show that $n(A \cup B) = 19$.

Answer:

Exercise 23J Probability from Venn diagrams

Non-calculator

1 The Venn diagram shows 24 students. A student is chosen at random. Find the probability that the student is in...



(a) A

Answer:

(b) B

Answer:

(c) $A \cap B$

Answer:

(d) $A \cup B$

Answer:

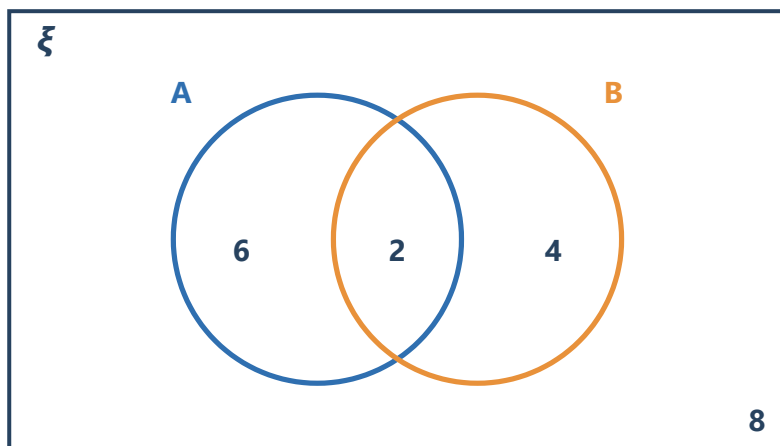
(e) A'

Answer:

(f) $A \cap B'$

Answer:

- 2 The Venn diagram shows the numbers of people in a group who like tea (A) and coffee (B). One person is chosen at random. Find the probability that the person likes tea.



Answer:

- 3 30 students were asked about sport. 18 play football (F), 12 swim (S) and 5 do both. A student is chosen at random. Find the probability that the student...

(a) plays football but does not swim

Answer:

(b) plays neither sport

Answer:

(c) plays at least one of the sports

Answer:

(d) plays exactly one of the sports

Answer:

- 4 40 people were asked about pets. 25 own a cat (C), 17 own a dog (D) and 6 own both. A person is chosen at random. Find the probability that the person owns...

(a) a cat only

Answer:

(b) a dog

Answer:

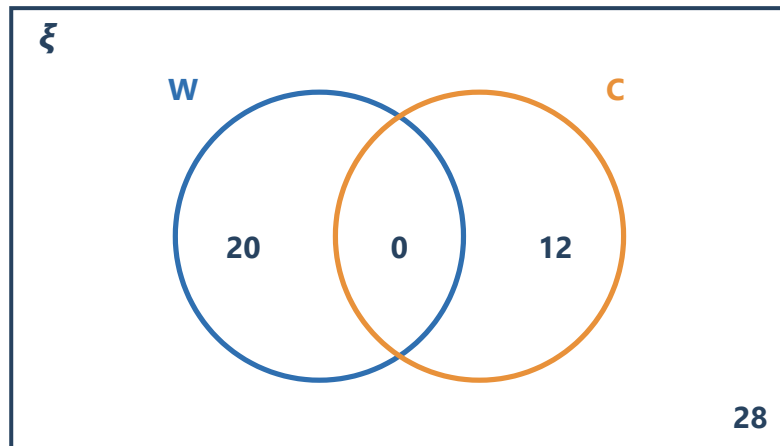
(c) no cat

Answer:

(d) neither pet

Answer:

- 5 The numbers of students in a year group who walk (W) and cycle (C) to school are shown. Find the probability that a student chosen at random walks or cycles.



Answer:

- 6 In a Venn diagram, $n(A) = 12$, $n(B) = 9$, $n(A \cap B) = 4$ and $n(\xi) = 30$. Find the probability that a randomly chosen element is in neither A nor B.

Answer:

- 7 In a group of 24 students, 13 are in set A and 12 are in set B, and 5 are in both. Ali says: " $P(A) = \frac{13}{24}$ and $P(B) = \frac{12}{24}$, so $P(A \text{ or } B) = \frac{25}{24}$." Explain why Ali must be wrong.

Answer: