5.6 Venn Diagrams and Set Notation: 30-minute Pack

Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 In a class of 50 pupils, 28 play tea, 17 play coffee and 1 play both tea and coffee. One pupil is chosen at random. Work out the probability that the pupil plays neither tea nor coffee.

(4)

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2 The universal set is the whole numbers from 1 to 12. Set A = {1, 2, 8, 10, 11, 12} and set B = {4, 7, 8, 10, 11}.
Work out the number of elements in A or B or both.

(2)

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3 In a class of 27 pupils, 11 play cats, 17 play dogs and 6 play both cats and dogs.
How many pupils play cats only?

(2)

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4 The universal set is the whole numbers from 1 to 10. Set A = {1, 2, 3, 6, 8} and set B = {1, 2, 5}.
List the numbers that are not in A (the complement of A).

(2)

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5 The universal set is the whole numbers from 1 to 20. Set A = {2, 9, 12, 13} and set B = {5, 12, 17}.
List the numbers that are in both A and B.

(2)

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6 In a group of 50 pupils, 30 study French and 22 study German. If 10 study both French and German, how many pupils study at least one of French or German?

(2)

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7 Complete the two-set Venn diagram. There are 40 people. 18 are in A, 15 are in B and 7 are in neither. Fill the three regions: A only, B only, and A n B.

(a) A n B (both) **(1)**

(b) A only **(1)**

(c) B only **(1)**

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8 If U is the universal set and A is a subset of U, what is A u A'? State the result.

(1)

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9 n(U) = 80 and n(A') = 35. Find n(A).

(2)

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10 In a class of 36 students, 21 play football, 18 play basketball, and 8 play both sports.

(a) Find the number of students who play exactly one of the two sports. **(2)**

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(b) Calculate the probability that a randomly selected student plays exactly one of the two sports, giving your answer as a fraction in simplest form. **(2)**

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Mark scheme · 5.6 Venn Diagrams and Set Notation: 30-minute Pack

Question 1

27 tea only, 16 coffee only, 1 both	M1
44 play at least one	M1
50 - 44	M1
3/25 cao	A1

Answer: **3/25**

Question 2

n(A) + n(B) - n(both)	M1
8 cao	A1

Answer: **8**

Question 3

11 - 6	M1
5 cao	A1

Answer: **5**

Question 4

at least half the numbers	M1
4, 5, 7, 9, 10 cao	A1

Answer: **4, 5, 7, 9, 10**

Question 5

at least one correct number or a clear method	M1
12 cao	A1

Answer: **12**

Question 6

use inclusion-exclusion: 30 + 22 - 10 oe	M1
42 cao	A1

Answer: **42 pupils**

Question 7

(a) A n B = A + B - (in at least one) cao	B1

(a) Answer: **0**

(b) A only = A total minus overlap cao	B1

(b) Answer: **18**

(c) B only = B total minus overlap cao	B1

(c) Answer: **15**

Question 8

A union A' is the universal set U cao	B1

Answer: **U (the universal set)**

Question 9

80 - 35 oe	M1
45 cao	A1

Answer: **45**

Question 10

(a) football only = 21 - 8 = 13 and basketball only = 18 - 8 = 10	M1
(a) 23 cao	A1

(a) Answer: **23**

(b) 23/36 shown	M1
(b) 23/36 cao (already simplest form)	A1

(b) Answer: **23/36**

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