5.6 Venn Diagrams and Set Notation: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 In a class of 35 pupils, 9 play football, 18 play hockey and 3 play both football and hockey.
One pupil is chosen at random. Work out the probability that the pupil plays both football and hockey.

(1)

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2 In a class of 43 pupils, 15 play tea, 26 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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3 The universal set is the whole numbers from 1 to 12. Set A = {3, 9, 10, 12} and set B = {2, 10, 11}.
List the numbers that are not in A (the complement of A).

(2)

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4 The universal set is the whole numbers from 1 to 15. Set A = {1, 2, 7, 9, 12, 13} and set B = {5, 9, 10, 11, 14}.
List the numbers that are in both A and B.

(2)

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5 In a class of 51 pupils, 21 play French, 27 play Spanish and 7 play both French and Spanish.
One pupil is chosen at random. Work out the probability that the pupil plays neither French nor Spanish.

(4)

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6 The universal set is the whole numbers from 1 to 20. Set A = {1, 6, 7, 8, 13, 17} and set B = {1, 2, 3, 13, 15}.
List the numbers that are in both A and B.

(2)

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7 The universal set is the whole numbers from 1 to 20. Set A = {1, 4, 5, 17, 19} and set B = {6, 9, 11, 14, 15, 19}.
Work out the number of elements in A or B or both.

(2)

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8 In a class of 26 pupils, 8 play French, 20 play Spanish and 5 play both French and Spanish.
How many pupils play French only?

(2)

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9 In a class of 34 pupils, 13 play football, 20 play hockey and 7 play both football and hockey.
One pupil is chosen at random. Work out the probability that the pupil plays both football and hockey.

(1)

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10 In a class of 41 pupils, 13 play football, 25 play hockey and 1 play both football and hockey.
One pupil is chosen at random. Work out the probability that the pupil plays neither football nor hockey.

(4)

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11 In a class of 46 pupils, 27 play French, 16 play Spanish and 3 play both French and Spanish.
How many pupils play French only?

(2)

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12 In a class of 41 pupils, 10 play French, 25 play Spanish and 6 play both French and Spanish.
How many pupils play neither French nor Spanish?

(3)

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13 In a class of 36 pupils, 14 play tea, 21 play coffee and 6 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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14 The universal set is the whole numbers from 1 to 10. Set A = {1, 2, 3, 5} and set B = {1, 2, 9}.
List the numbers that are in A or in B or in both.

(2)

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15 In a class of 36 pupils, 29 play French, 12 play Spanish and 7 play both French and Spanish.
How many pupils play French only?

(2)

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16 In a club of 80 members, 50 like tea, 30 like coffee and 10 like both. What is the probability that a randomly chosen member likes tea or coffee or both? Give your answer as a fraction in simplest form.

(2)

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17 State what the notation A n B means.

(1)

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18 In a class of 32 pupils, every pupil is in set P only, set Q only, both P and Q, or neither. 14 are in P only, 10 are in Q only, 5 are in both P and Q, and 3 are in neither. Find n(P).

(2)

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19 In a group of 60 students, 6 are in all three clubs: Art, Drama and Music. 14 are in both Art and Drama, 10 are in both Art and Music, and 9 are in both Drama and Music (each of these pairwise totals includes the 6 students in all three).

(a) Find the number of students who are in exactly two of the three clubs (not all three). **(2)**

(b) Find the probability that a randomly selected student is in exactly two of the three clubs, giving your answer as a fraction in simplest form. **(2)**

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Mark scheme · 5.6 Venn Diagrams and Set Notation: 1-hour Pack

Question 1

3/35 cao	B1

Answer: **3/35**

Question 2

14 tea only, 25 coffee only, 1 both	M1
40 play at least one	M1
43 - 40	M1
3/43 cao	A1

Answer: **3/43**

Question 3

at least half the numbers	M1
1, 2, 4, 5, 6, 7, 8, 11 cao	A1

Answer: **1, 2, 4, 5, 6, 7, 8, 11**

Question 4

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

Answer: **9**

Question 5

14 French only, 20 Spanish only, 7 both	M1
41 play at least one	M1
51 - 41	M1
10/51 cao	A1

Answer: **10/51**

Question 6

at least one correct number or a clear method	M1
1, 13 cao	A1

Answer: **1, 13**

Question 7

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

Answer: **10**

Question 8

8 - 5	M1
3 cao	A1

Answer: **3**

Question 9

7/34 cao	B1

Answer: **7/34**

Question 10

12 football only, 24 hockey only, 1 both	M1
37 play at least one	M1
41 - 37	M1
4/41 cao	A1

Answer: **4/41**

Question 11

27 - 3	M1
24 cao	A1

Answer: **24**

Question 12

10 + 25 - 6 = 29	M1
41 - 29	M1
12 cao	A1

Answer: **12**

Question 13

8 tea only, 15 coffee only, 6 both	M1
29 play at least one	M1
36 - 29	M1
7/36 cao	A1

Answer: **7/36**

Question 14

at least half the numbers	M1
1, 2, 3, 5, 9 cao	A1

Answer: **1, 2, 3, 5, 9**

Question 15

29 - 7	M1
22 cao	A1

Answer: **22**

Question 16

use inclusion-exclusion: 50 + 30 - 10 = 70 oe	M1
70/80 = 7/8 simplified cao	A1

Answer: **7/8**

Question 17

elements that are in both A and B (intersection) cao	B1

Answer: **elements in both A and B**

Question 18

n(P) = P only + both = 14 + 5	M1
19 cao	A1

Answer: **19**

Question 19

(a) Art and Drama only = 14 - 6 = 8, Art and Music only = 10 - 6 = 4, Drama and Music only = 9 - 6 = 3	M1
(a) 15 cao	A1
(a) Answer: **15**	
(b) 15/60 shown	M1
(b) 1/4 cao	A1
(b) Answer: **1/4**	

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