5.23 Venn Diagrams: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

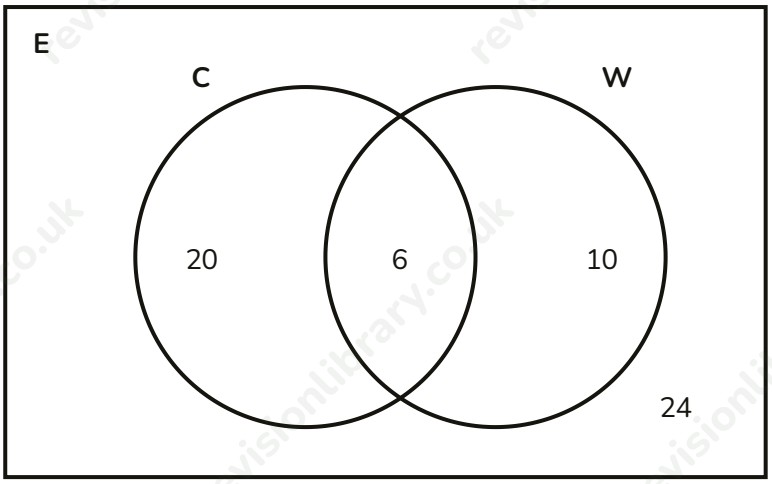
Answer ALL questions. Show all your working.

1 A class of pupils is asked about clubs. 8 pupils are in the drama club only, 6 are in the music club only and 5 are in both clubs. Draw a simple two-circle Venn diagram and write the numbers in each region. How many pupils are in at least one club?

(Total for Question 1 is 2 marks)

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2 60 employees at a company were asked whether they cycle (C) or walk (W) to work. The Venn diagram shows: 20 employees in C only, 6 employees in the overlap of C and W, 10 employees in W only, and 24 employees outside both circles.



(a) An employee is chosen at random. Find P(C). **(2)**

.....

(b) Find the probability that an employee neither cycles nor walks to work. **(1)**

.....

(Total for Question 2 is 3 marks)

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3 The universal set is E = {1, 2, 3, ..., 20}. A = {factors of 20}. B = {multiples of 5}.

(a) List the elements of set A. **(1)**

(b) List the elements of set B. **(1)**

(c) Find A intersect B. **(1)**

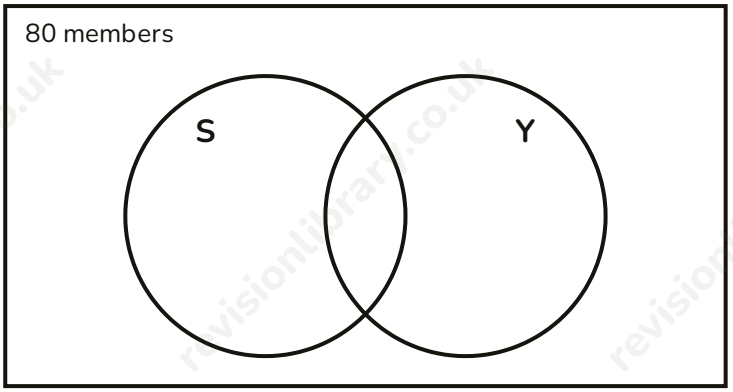
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(Total for Question 3 is 3 marks)

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4 A gym with 80 members recorded whether members attend spin classes (S) and yoga classes (Y) in the two-way table below.

	Yoga	No Yoga	Total
Spin	12	28	40
No Spin	18	22	40
Total	30	50	80



(a) Draw a Venn diagram to represent this information, using circles S and Y. State the number of members in each region. **(3)**

(b) A member is selected at random. Find the probability they attend yoga but not spin. **(2)**

(c) Given that a member attends yoga, find the probability that they also attend spin. **(2)**

(Total for Question 4 is 7 marks)

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5 In a school of 40 students, 3/5 of the students like Maths, 1/2 like Science, and 1/4 like both Maths and Science.

(a) Find the number of students who like Maths. **(1)**

.....

(b) Find the number of students who like Science. **(1)**

.....

(c) Find the number of students who like both Maths and Science. **(1)**

.....

(d) Work out the number of students who like neither Maths nor Science. **(3)**

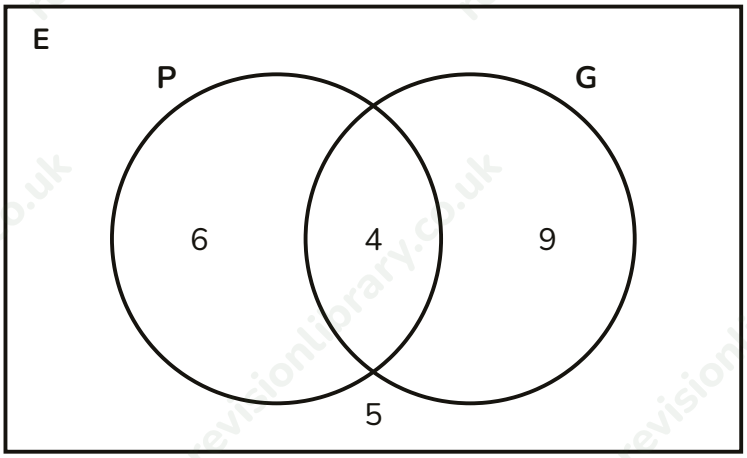
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(Total for Question 5 is 6 marks)

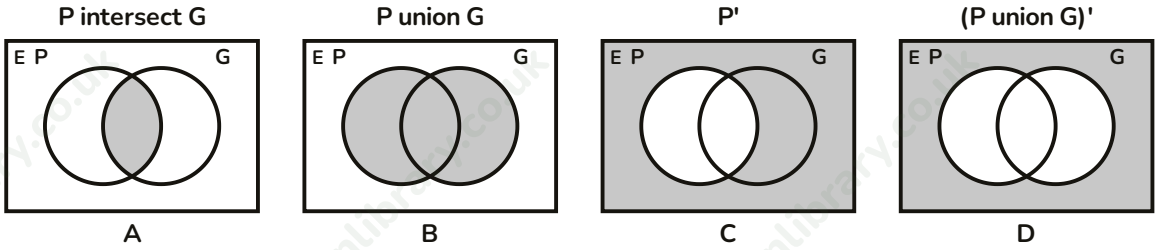
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6 A class of 24 students was asked whether they play piano (P) or guitar (G). The Venn diagram shows: 6 students in P only, 4 students in the overlap of P and G, 9 students in G only, and 5 students outside both circles.

Venn diagram for parts (a)-(c)



Part (d): which diagram below has the correct region shaded?



(a) Write down n(E). **(1)**

(b) Write down n(P'). **(1)**

(c) A student is picked at random. Find P(P intersect G'). **(2)**

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(d) Which shaded region below represents students who play at least one instrument? **(1)**

A) P intersect G B) P union G C) P' D) (P union G)'

- [ ] A) P intersect G
- [ ] B) P union G
- [ ] C) P'
- [ ] D) (P union G)'

(Total for Question 6 is 5 marks)

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Mark scheme · 5.23 Venn Diagrams: 30-minute Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

correct placement of 8, 6 and 5 in the three regions of a two-set Venn diagram **M1**

19 cao (8 + 6 + 5) **A1**

Answer: 19 pupils; diagram regions: drama only 8, music only 6, both 5.

Question 2

(a) (20 + 6)/60 oe seen **M1**

(a) 13/30 oe **A1**

(a) Answer: 13/30

(b) 2/5 oe (24/60) **B1**

(b) Answer: 2/5

Question 3

(a) {1, 2, 4, 5, 10, 20} cao (any order) **B1**

(a) Answer: A = {1, 2, 4, 5, 10, 20}

(b) {5, 10, 15, 20} cao **B1**

(b) Answer: B = {5, 10, 15, 20}

(c) {5, 10, 20} cao, ft from parts (a) and (b) **B1**

(c) Answer: A intersect B = {5, 10, 20}

Question 4

(a) 12 placed correctly in the overlap of S and Y **B1**

(a) 28 in S only and 18 in Y only, ft from their overlap value **M1**

(a) 22 outside both circles, cao **A1**

(a) Answer: S only = 28, both = 12, Y only = 18, neither = 22

(b) 18/80 oe seen **M1**

(b) 9/40 oe **A1**

(b) Answer: 9/40

(c) 12/30 oe seen **M1**

(c) 2/5 oe **A1**

(c) Answer: 2/5

Question 5

(a) 24 cao **B1**

(a) Answer: 24

(b) 20 cao **B1**

(b) Answer: 20

(c) 10 cao **B1**

(c) Answer: 10

(d) 24 + 20 - 10 (= 34) to find n(M union S), ft from parts (a) to (c) **M1**

(d) 40 - their 34, dependent on previous method mark **M1**

(d) 6 cao **A1**

(d) Answer: 6

Question 6

(a) 24 cao **B1**

(a) Answer: 24

(b) 14 cao **B1**

(b) Answer: 14

(c) 6/24 oe seen **M1**

(c) 1/4 oe **A1**

(c) Answer: 1/4

(d) B cao **B1**

(d) Answer: B) P union G

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