

Venn Diagrams PPQs

1. Given the following information, complete the Venn diagram shown below.

- $\epsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
- **A** is the set of factors of 24
- **B** is the set of multiples of 3
- **C** is the set of common factors of 30 and 70

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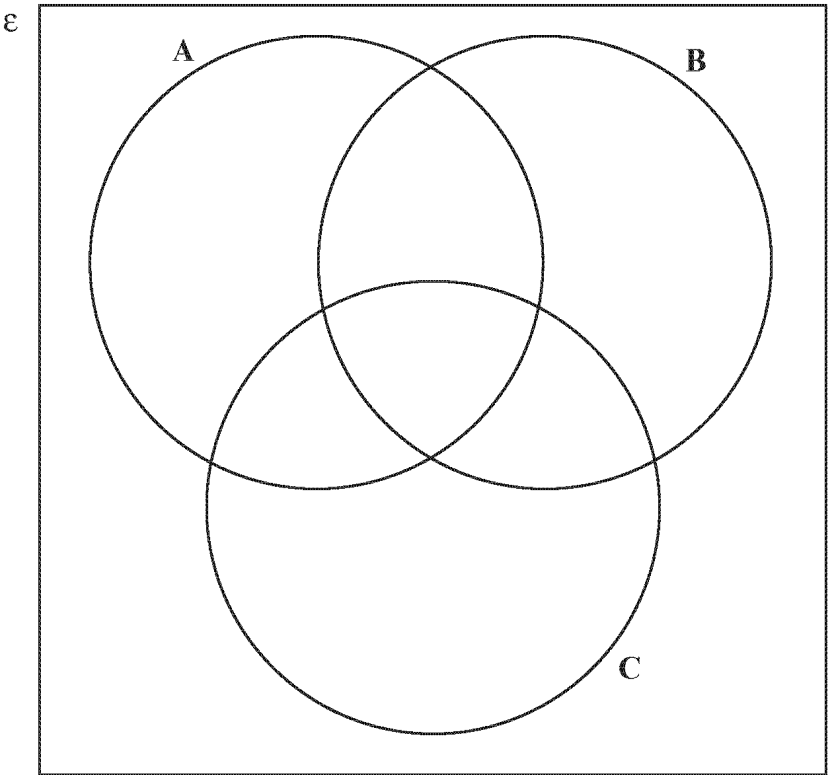
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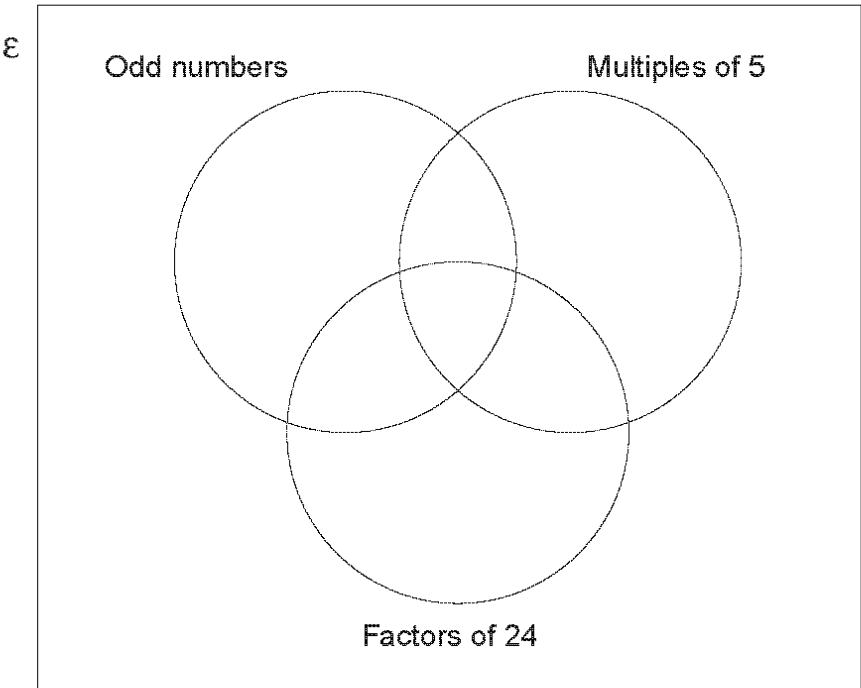
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[4]

2.

- (a) Place the whole numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in the correct positions in the Venn diagram. [3]



- (b) A whole number is selected at random from the set {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.

Find the probability that the number selected is:

- an odd number
an odd number that is a factor of 24
not a multiple of 5 and not a factor of 24.

[3]

3.

The universal set, $\mathcal{E} = \{22, 23, 24, 25, 26, 27, 28, 29, 30\}$.

Within this universal set \mathcal{E} ,

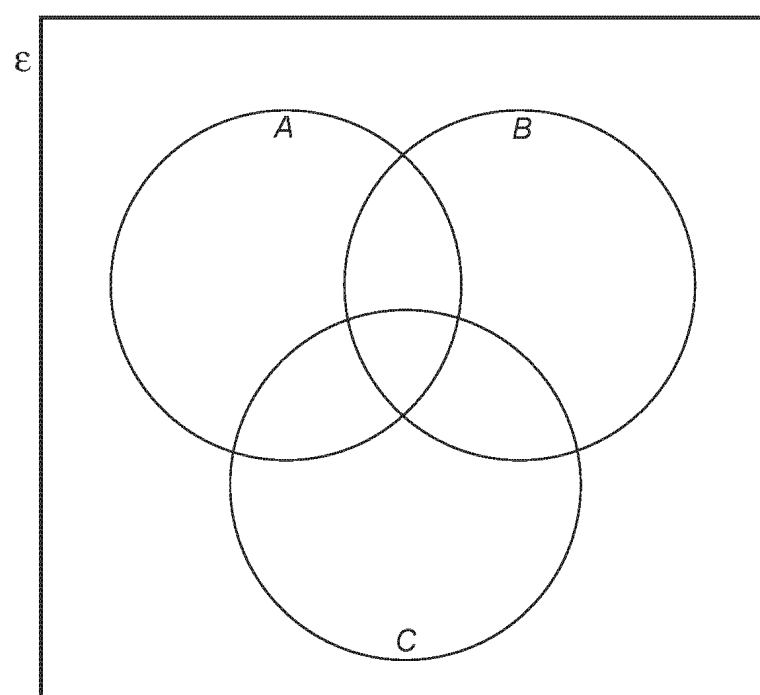
- set A is the multiples of 2
- set B is the multiples of 4
- set C is the multiples of 5

(a) Complete the Venn diagram.

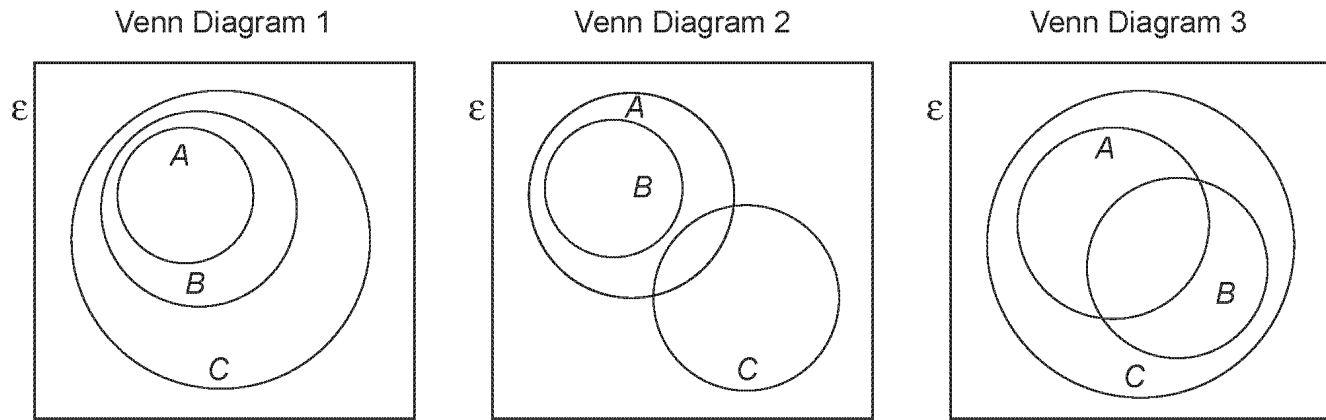
[3]

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- (b) Which one of the following Venn diagrams could also be used to represent the sets \mathcal{E} , A , B and C ?
You must give a reason for your choice. [2]



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- (c) A whole number is selected at random from the universal set $\mathcal{E} = \{22, 23, 24, 25, 26, 27, 28, 29, 30\}$.

Find the probability that the number selected is: [3]

a multiple of 2 but not a multiple of 4

not a multiple of 5

a multiple of 5 and a multiple of 2

[#]

4.

A survey about the cereals that people bought was conducted in a local supermarket on a Saturday afternoon.

95 people bought Brecky Bix, 100 people bought Crispy Flakes and 59 people bought Pop Chocs.

Of these people

- 50 bought Brecky Bix and Crispy Flakes
- 37 bought Brecky Bix and Pop Chocs
- 25 bought Crispy Flakes and Pop Chocs
- 5 bought Brecky Bix, Crispy Flakes and Pop Chocs

Everyone surveyed bought at least one of these cereals.

How many people took part in this survey?

The number of people that took part in the survey =

[6]

5.

During a primary school activity day, children could take part in any of three different activities. 80 children played football, 95 children played rounders and 30 children danced.

40 children played football and rounders.

12 children played rounders and danced.

20 children played football and danced.

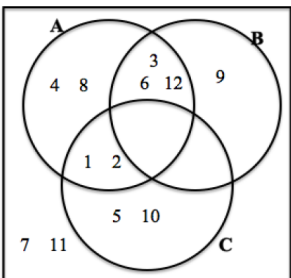
3 children took part in all three activities.

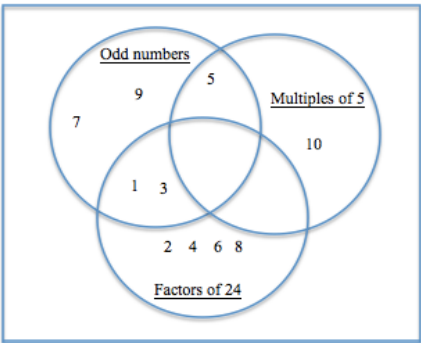
Draw a Venn diagram to show the above information and find the total number of children who took part in the activity day.

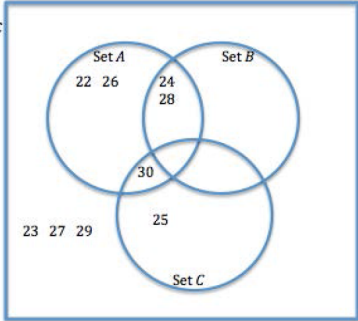
The total number of children who took part in the activity day =

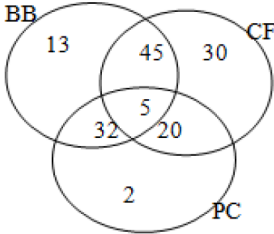
[6]

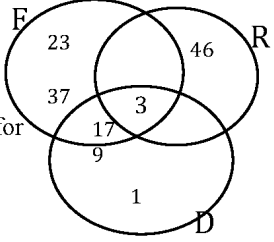
Marking Scheme

1.	3. Venn diagram correct		B4 No extra number >12 Mark unique placements of numbers, for duplicates mark the incorrect number then award as follows: B3 for any 9, 10 or 11 numbers correctly placed with no more than 1 extra number >12 B2 for any 6, 7 or 8 numbers correctly placed with no more than 2 extra numbers >12 B1 for any 3, 4 or 5 numbers correctly placed and ignore any extra numbers If no marks awarded SC1 for sight of sets A, B and C correct (including any extra numbers), shown in working or within Venn diagram 4
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Methods in Mathematics June 2015 Unit 1 Higher Tier		Mark	Comment
1. (a)		B3	Penalise any extra numbers (e.g. >10), -1 only B2 for 8 or 9 of the numbers placed correctly, marking any repeats as incorrect, OR B1 for 5, 6 or 7 of the numbers placed correctly, marking any repeats as incorrect
(b) 5/10 ISW 2/10 ISW 2/10 ISW		B1 B1 B1 6	Accept equivalents throughout CAO Now FT consistent incorrect denominator: OR FT from their Venn diagram. OR FT from their Venn diagram If no marks in (b) award SC1 for 5, 2 and 2 or identifying the correct regions by listing the correct numbers Penalise incorrect notation once only, -1

3.	5(a) All 9 numbers placed correctly		B3 B2 for any 7 or 8 numbers placed correctly, the other numbers omitted or incorrectly placed, OR B1 for any 5 or 6 numbers placed correctly, the other numbers omitted or incorrectly placed. Any ambiguous duplicates are marked as an incorrect placement for that number
(b) Venn diagram 2 AND full reason, e.g. 'multiples of 4 are a subset of multiples of 2 and there is a multiple of 2 which is a multiple of 5', or 'set B is a subset of set A, and set A intersects with set C', or 'A & B share some of the numbers, but C only shares numbers with A', or 'C & B have nothing in common, and B shares everything with A'		E2	OR selects Venn diagram 2 and explains why the other 2 Venn diagrams are not selected E1 for choice of Venn diagram 2 AND a partial reason, i.e. only mentions 1 aspect or attempts an explanation e.g. '4 times table is within 2 times table', or 'shows which of A are within 4 times table', or '22 is in A but not in C', or 'no multiples of 4 in C' OR E1 for selection of Venn diagram 2 and explains why 1 of the other 2 Venn diagrams are not selected Accept informal words such as 'within' for 'subset', 'overlap' for 'intersection'
(c) 3/9 (=1/3) 7/9 1/9		B1 B1 B1 8	FT their Venn diagram. FT a slip in the denominator used consistently FT a slip in the denominator used consistently

4.	<p>11. Three circles with the number 5 in the correct place 45 correct for Brecky Bix & Crispy Flakes only 32 correct for Brecky Bix & Pop Chocs only 20 correct for Crispy Flakes & Pop Chocs only 13 30 2 (any 2 correct) The number of people that took part in the survey = 147</p> 	<p>B1 B1 B1 B1 B1 B1 6</p> <p>CAO</p>
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5.	<p>11. Three circles with the number 3 in the correct place 37 correct for football & rounders only 9 correct for rounders & dance only 17 correct for football & dance only 23 46 1 (any 2 correct) & correct labeling</p> <p>136 children</p>	<p>B1 B1 B1 B1 B1 B1 6</p> <p>Accept F, R, D for labels CAO</p> 
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