Solution

Venn Diagrams PPQs

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

- $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
- **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

B4 All

B3 9,10,11 ✓

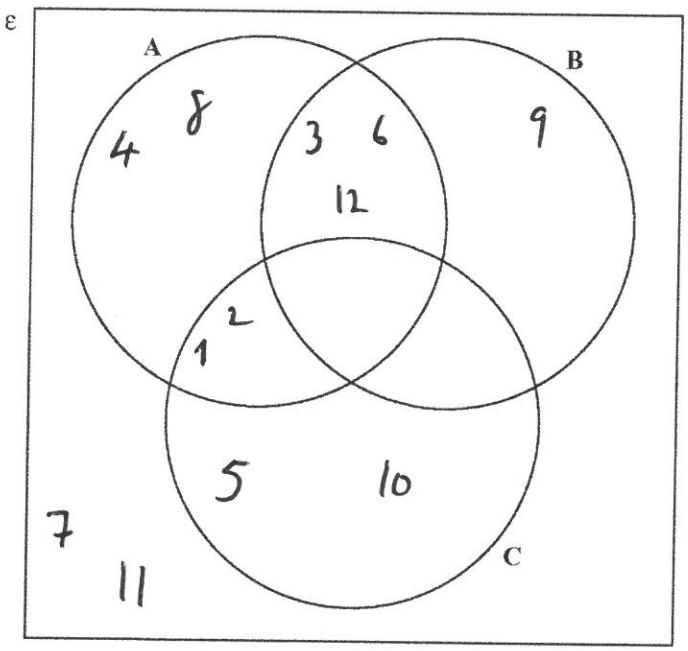
B2 6,7,8 ✓

B1 3,4,5 ✓

A: 1, 2, 3, 4, 6, 8, 12

B: 3, 6, 9, 12

C: 1, 2, 5, 10



[4]

30

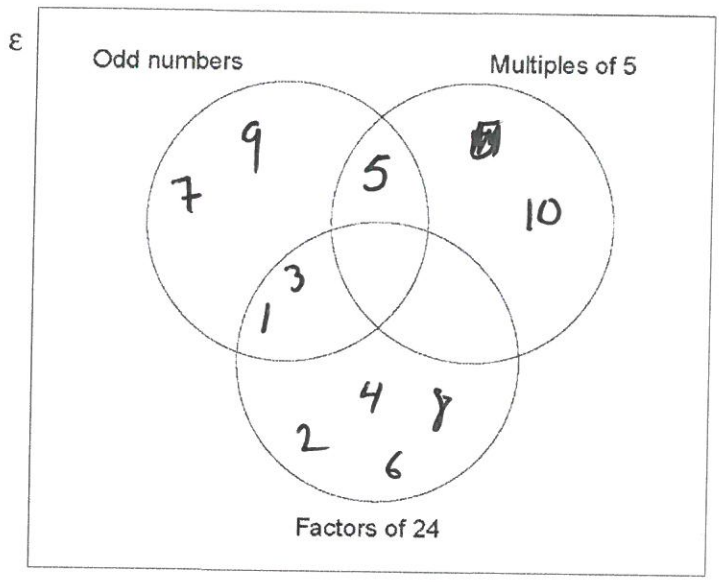
1 30
2 15
3 10
5 6

70

1 70
2 35
5 14
7 10

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]



B3 All
B2 8 or 9 ✓
B1 5, 6, 7 ✓

(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 ..... 5/10 ..... B1

an odd number that is a factor of 24 ..... 2/10 ..... B1

not a multiple of 5 and not a factor of 24. ..... 2/10 ..... B1

[3]

ODD: 1, 3, 5, 7, 9

MULT5: 5, 10

FACT 24: 1, 2, 3, 4, 6, 8

3.

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

Within this universal set ε,

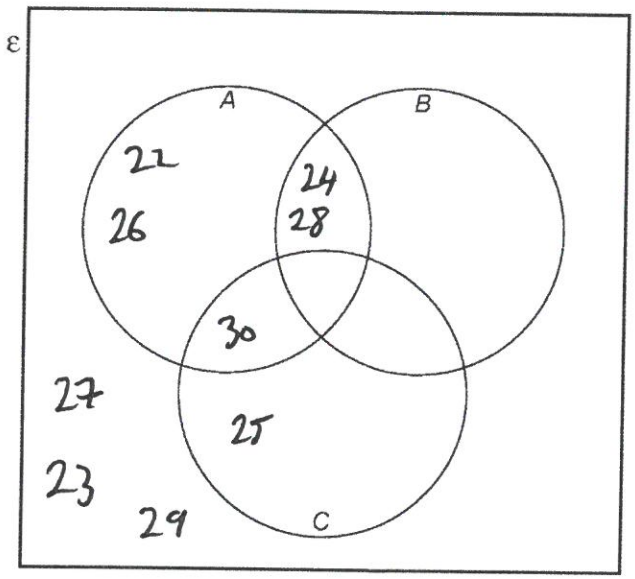
- set A is the multiples of 2 : 22, 24, 26, 28, 30
- set B is the multiples of 4 24, 28
- set C is the multiples of 5 25, 30

(a) Complete the Venn diagram. [3]

B3 All ✓

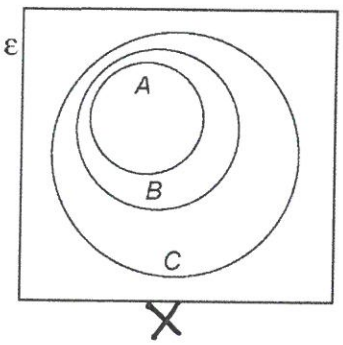
B2 7 or 8 ✓

B1 5 or 6 ✓

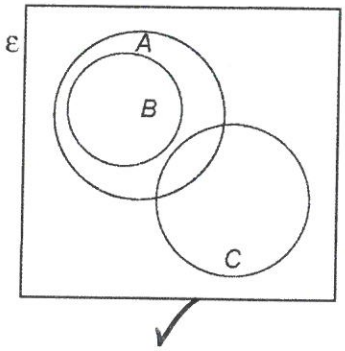


(b) Which one of the following Venn diagrams could also be used to represent the sets ε, *A*, *B* and *C*?
You must give a reason for your choice. [2]

Venn Diagram 1



Venn Diagram 2



Venn Diagram 3

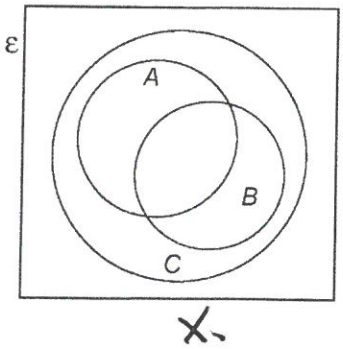


Diagram 2 because members of B are all in set A there is no intersection between sets B & C but there is between A and C B1 E1

(c) A whole number is selected at random from the universal set
ε = {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 3/9 B1

not a multiple of 5 7/9 B1

a multiple of 5 and a multiple of 2 1/9 B1

[#]

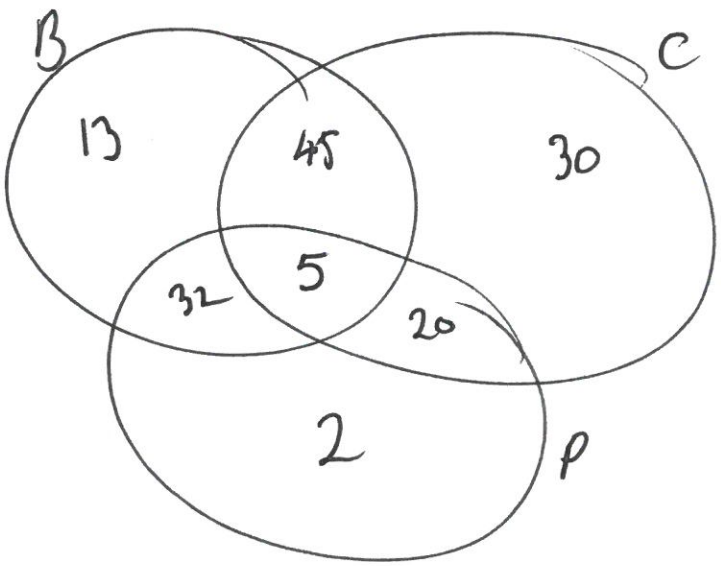
4. A survey about the cereals that people bought was conducted in a local supermarket on a Saturday afternoon.
95 people bought Brecky Bix, 100 people bought Crispy Flakes and 59 people bought Pop Chocs.

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?



B1 5
B1 45
B1 32
B1 20
B1 13, 30, 2
B1 147

The number of people that took part in the survey = 147

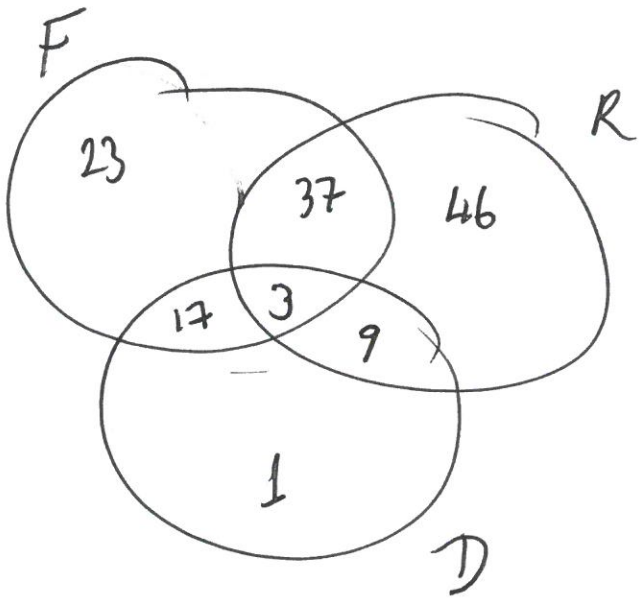
[6]

5. During a primary school activity day, children could take part in any of three different activites.
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.



B1 3
B1 37
B1 9
B1 17
B1 23 46 1
B1 136

The total number of children who took part in the activity day = 136

[6]