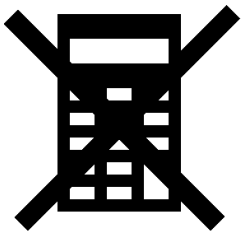
AQA, OCR, Edexcel

GCSE

GCSE Maths

Sets & Venn Diagrams

Name: Solutions

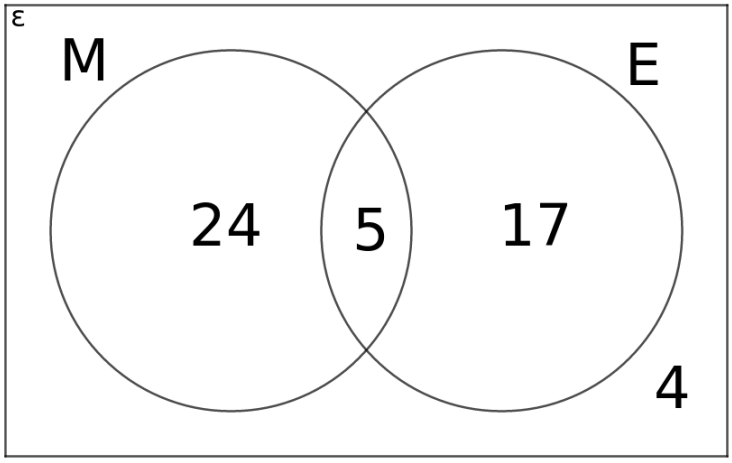


Guidance

1. Read each question carefully.
2. Don't spend too long on each question.
3. Attempt every question.
4. Always show your workings.

Revise GCSE Maths:
www.MathsMadeEasy.co.uk/gcse-maths-revision/

1. Students were polled on their preference between Maths and English classes. The results are displayed in the Venn Diagram below.



a) What is the probability that a student preferred Maths?

24+5 = 29 $\frac{29}{50}$

b) What is the probability that the student **did not** prefer English?

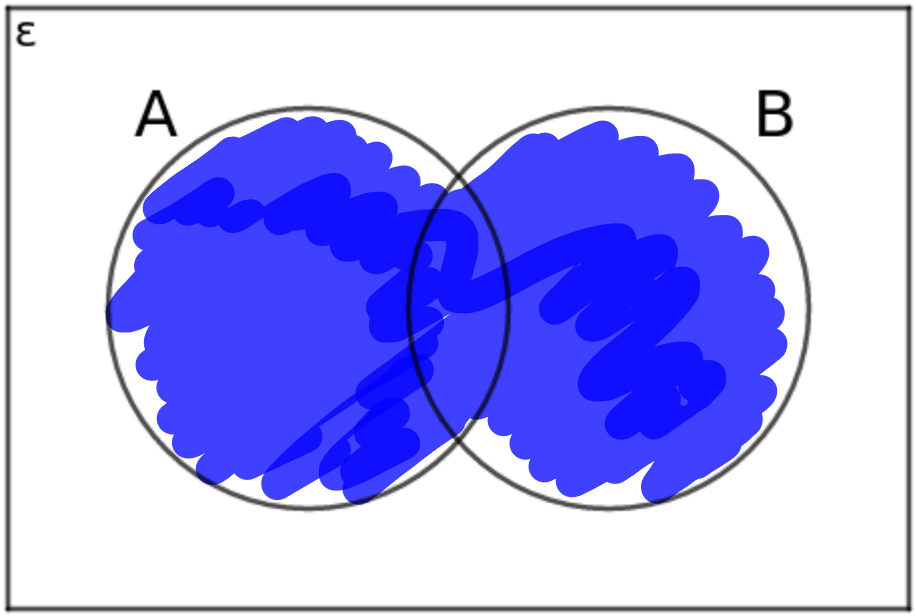
24+4 = 28 $\frac{28}{50}$ =14/25

c) What is the probability a student selected only a single subject as their preference?

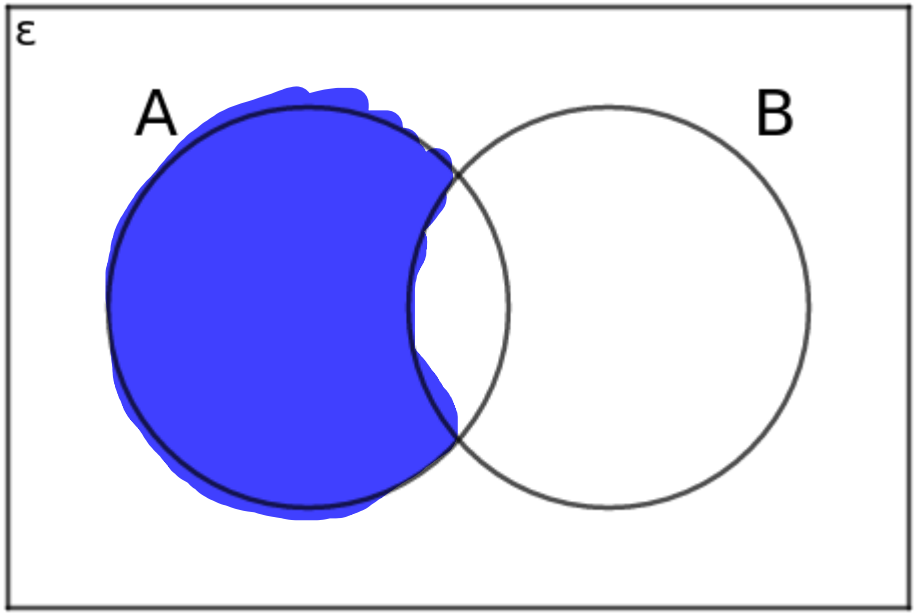
24+17 = 41 $\frac{41}{50}$

(3 marks)

2. In the diagram below, shade the region that represents $P(A \cup B)$

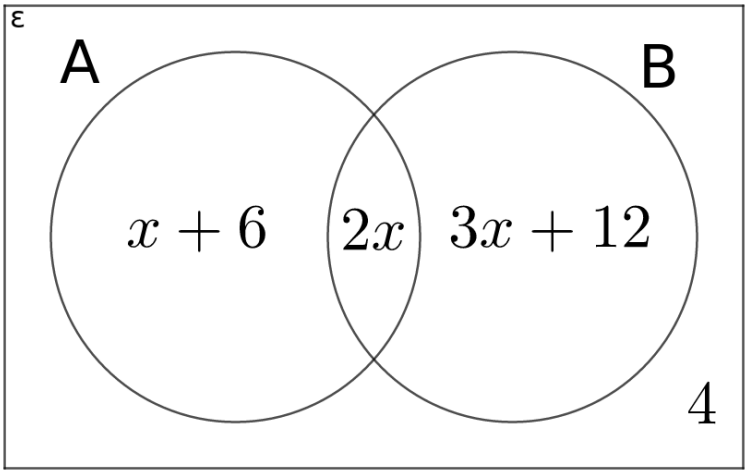


In the diagram below, shade the region that represents $P(A \cap B')$



(3 marks)

3. There are two sets displayed in the Venn diagram below. It is given that there are 64 items in the universal set, ε.



Find the value of x.

$x+6+2x+3x+12+4=64$

$6x+22=64$

$6x=42 \quad (-22)$

$x=7 \quad (\div 6)$

Find P(A)

$P(A) = \frac{x+6+2x}{64} = \frac{(3\times 7)+6}{64}$

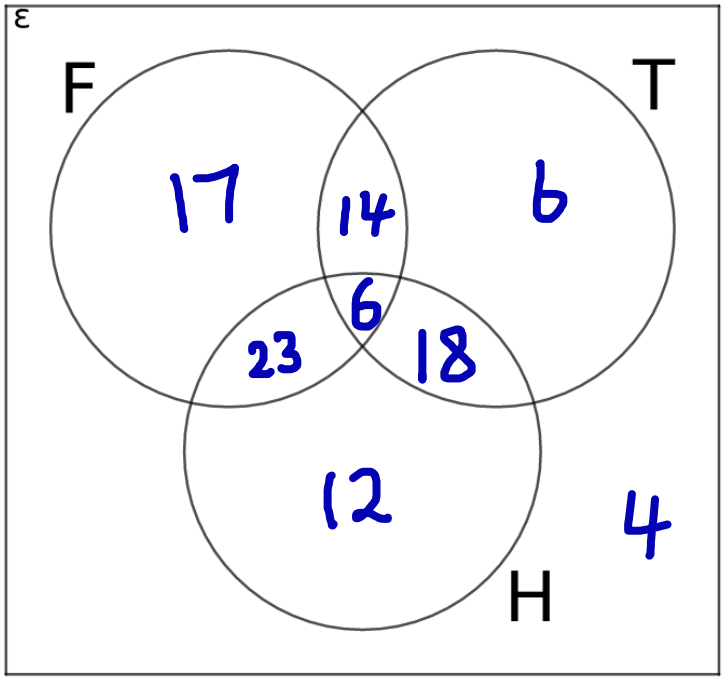
$= \frac{27}{64}$

(3 marks)

4. 100 students were asked what their favourite sport they do in P.E was.

6 students liked all three sports
24 students liked Hockey and Tennis
29 students liked Football and Hockey
20 students liked Football and Tennis
59 students like Hockey
17 students like only Football
4 students had no preference

Write this information in the diagram below.



What was the probability that a student liked only Tennis?

$\frac{6}{100}$ =3/50

What was the probability a student liked exactly two sports?

14 + 23 + 18 = 55

$\frac{55}{100}$ =11/20

(5 marks)

5. Given the information below, write down the numbers in the sets A, B, and C.

ε= {integers from 1 to 30}
A= {square numbers}
B= {prime numbers}
C= {Fibonacci numbers}

A = {1, 4, 9, 16, 25}

B = {2, 3, 5, 7, 11, 13, 17, 19, 23, 29}

C = {1, 2, 3, 5, 8, 13, 21}

What proportion of numbers in ε are not square numbers?

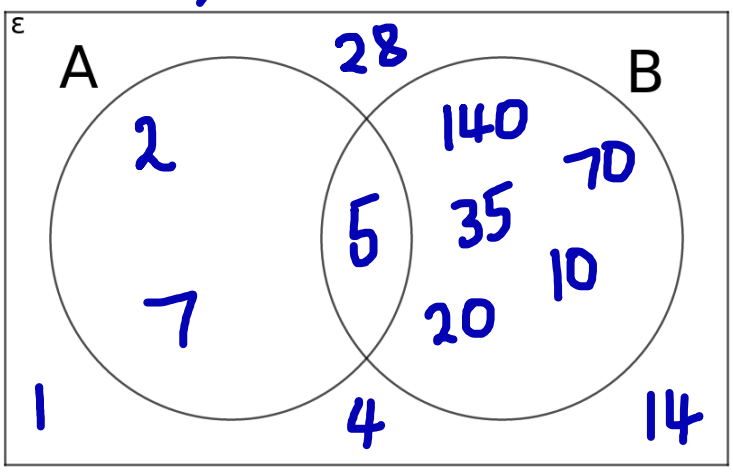
25/30 =5/6

(5 marks)

6. Represent the following sets in the diagram below

ε= {factors of 140}
A= {prime numbers}
B= {multiples of 5}

1, 140 2, 70 4, 35
5, 28 10, 14 7, 20

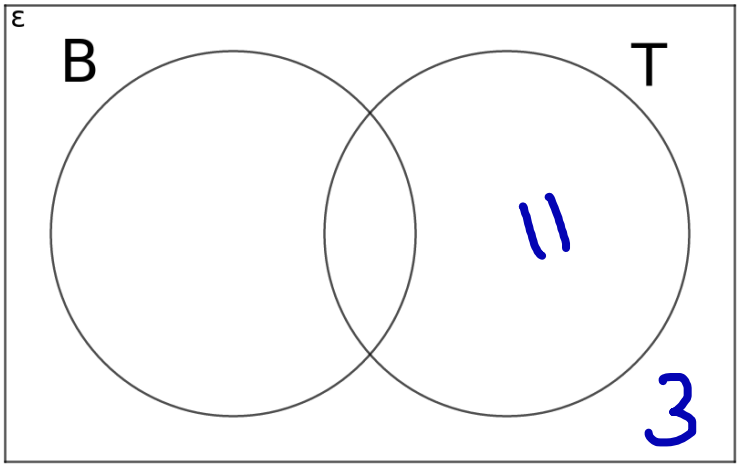


(4 marks)

7. Students were asked about their subjects taken in Year 10. The options in this case were Biology and Textiles.

   Originally, the probability that a student took Biology was 7/20.
   A new student joins the group and now the probability is 1/3.
   In both cases 3 students took neither of the two subjects.

   Fill in the Venn diagram with all the information you know.

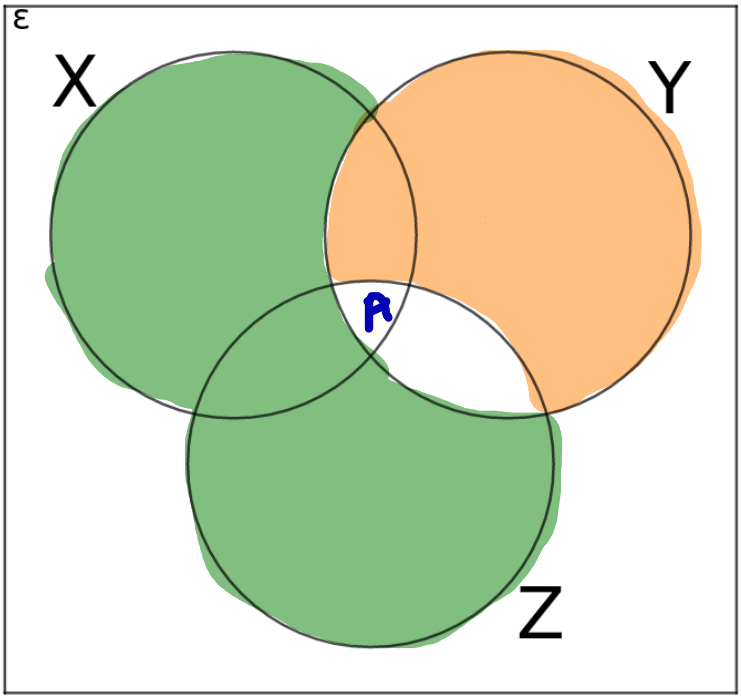


   Which of the following probabilities would help you fill in the rest of the Venn diagram? Tick all that apply.

- ☐ $P(B)$
- ☑ $P(B \cap T)$
- ☐ $P(B \cup T)$
- ☑ $P(T')$
- ☐ $P(B')$

(4 marks)

8. On the diagram, mark with the letter A the region $P(X \cap Y \cap Z)$



Shade in the region $P(Y \cap Z')$ and mark this with the letter B

Shade in the region $P(X \cup Z \cap Y')$ and mark it with the letter C

(3 marks)