Name: **Answers.**

Exam Style Questions

Venn Diagrams

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You may use tracing paper if needed

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this topic
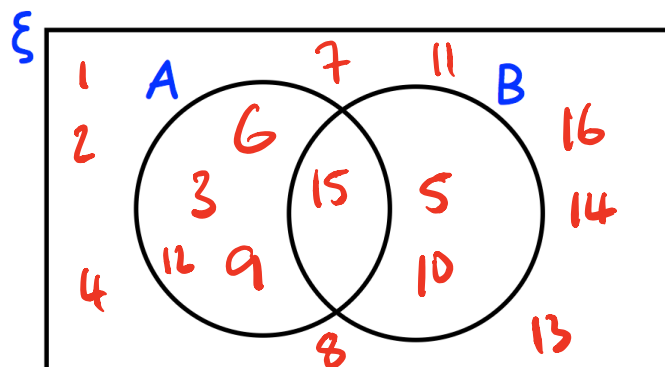
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Video 380

1.   ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16}

A = multiples of 3
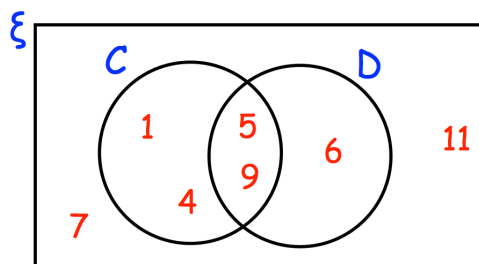B = multiples of 5

(a) Complete the Venn diagram

ξ

1   A   7   11   B
2   6   16
    3   15   5   14
   12 9   10
4   13
           8

(3)

One of the numbers is selected at random.

← 15

(b) Write down P (A ∩ B)

$\frac{1}{16}$

(1)

2.   Here is a Venn diagram

ξ

C   D
    1   5
        6   11
      9
  7 4

Write down the numbers that are in set

(a) D

5,6,9

(1)
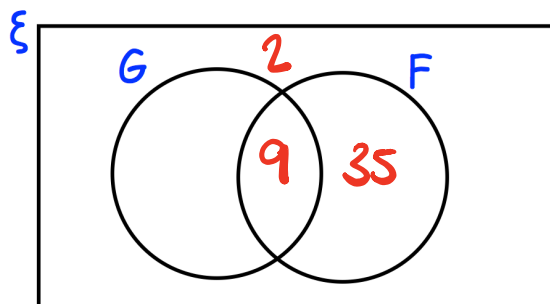
(b) C ∪ D

1,4,5,6,9

(1)

(c) C'

7,6,11

(1)

3. There are 80 students in year 11.

9 students study French and German.
35 students only study French
2 students do not study French or German.

(a) Complete the Venn diagram

(2)

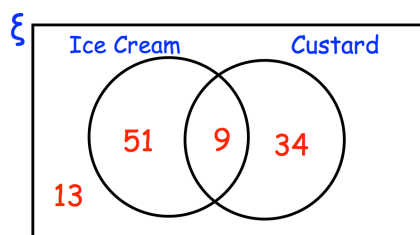(b) Work out how many students study only German.

$$35+9+2=46$$
$$80-46=34$$

........34........

(1)

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4. At a wedding, the guests may have ice cream or custard with their dessert. The Venn diagram shows information about the choices the guests made.

(a) How many guests had custard?

$$34+9=43$$

........43........

(1)

(b) How many guests had ice cream and custard?

........9........

(1)

(c) How many guests went to the wedding?

$$13+51+9+34=107$$

........107........

(1)

5.   Here is a Venn diagram.

Write down the numbers that are in set

(a) A ∩ B

.................4,9.................................
                                                    (1)

(b) A ∪ B

4,5,9,16,25,36 ....
                                                    (1)

(c) A'

.............5,17,40.........................
                                                    (1)

One of the numbers in the diagram is chosen at random.

(d) Find the probability that the number is in set B'

$$P(B') = \frac{5}{8}$$

                              $\frac{5}{8}$
                     ....
                                                    (1)

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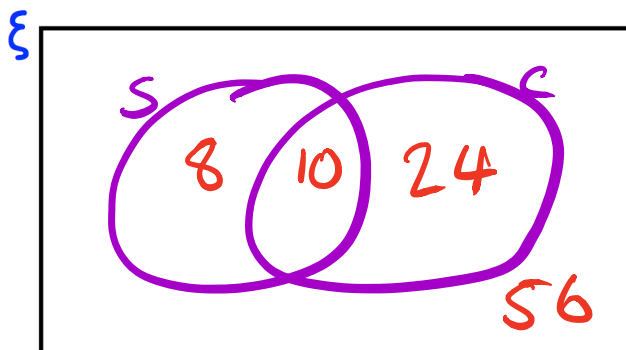6. A gym runs two fitness classes, spinning and circuits.

On Saturday 100 people visited the gym.
18 people attended the spinning class.
10 people attended both classes.
56 people did not attend either class.

(a) Represent this information on a Venn diagram

(3)

A person who attended the gym is selected at random.

Find the probability that this person

(b) attended only circuits

$56+8+10=74$
$100-74=24$

$\dfrac{24}{100}$ .... $\left(\dfrac{6}{25}\right)$

(2)

(c) attended exactly one class

$8+24=32$

$\dfrac{32}{100}$ .... $\left(\dfrac{8}{25}\right)$

(2)

(d) attended spinning, given that they attended circuits

$\dfrac{10}{10+24}$

$\dfrac{10}{34}$ .... $\left(\dfrac{5}{17}\right)$

(2)

7. Jennifer asked 80 people which sports they enjoy from Football, Hockey and Rugby.

(a) How many people enjoy all three sports?

31

(1)

(b) How many people enjoy football and hockey but not rugby?

14

(2)

(c) How many people enjoy football and rugby but not hockey?

17

(2)

(d) Work out which sport is enjoyed by the most number of people.

Football : 4 + 14 + 31 + 17 = 66

Rugby : 5 + 31 + 17 + 3 = 56

Hockey : 5 + 5 + 14 + 31 = 55

Football

(3)

8. In a class of 24 students

    12 students play the piano
    13 students play the guitar
    4 students play neither instrument.
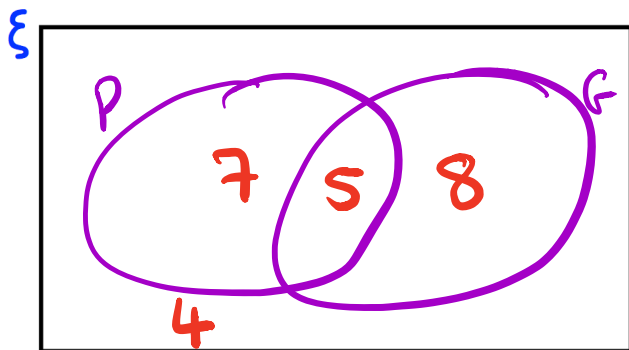
    (a) Represent this information on a Venn diagram

    24 − 4 = 20
    12 + 13 = 25
    25 − 20 = 5
    12 − 5 = 7
    13 − 5 = 8

    ξ
    P ⬭ 7 5 8 ⬭ G
    4

    (3)

    A student is selected at random.

    (b) Work out the probability that the student only plays the guitar.

    $\frac{8}{24}$ $\left(\frac{1}{3}\right)$

    (1)

9. In a company there are 110 workers.
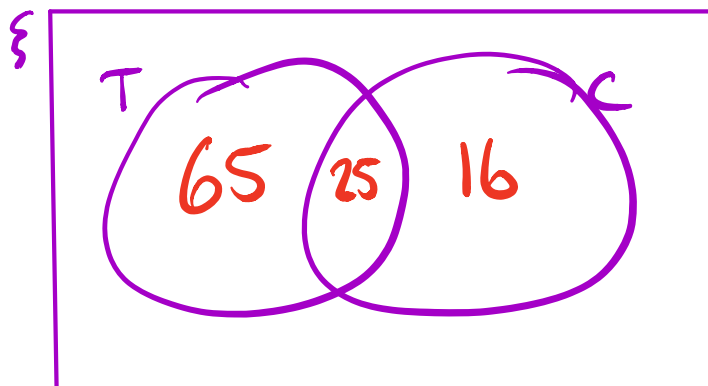
    90 workers like tea.
    41 workers like coffee.
    25 workers like both tea and coffee.

    65 + 25 + 16 = 106
    110 − 106 = 4

    Work out how many workers like neither tea or coffee.

    ξ
    T ⬭ 65 25 16 ⬭ C

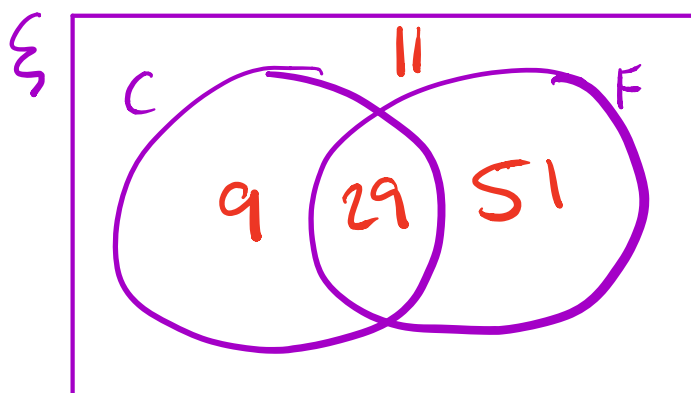   4

    (3)

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10. A group of friends have been surveyed.

38% have been to Canada.
80% have been to France.
11% have been to neither Canada or France.

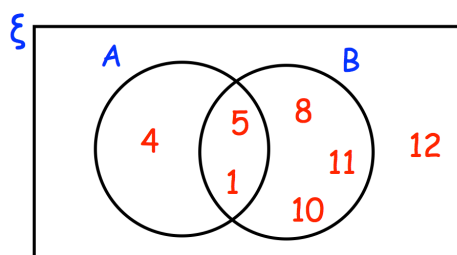Find the percentage of the group that have been to Canada and France.

$$100 - 11 = 89$$
$$38 + 80 = 118$$
$$118 - 89 = 29$$
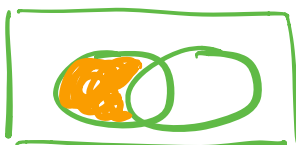$$38 - 29 = 9$$
$$80 - 29 = 51$$

.......29.......%

(4)

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11. Here is a Venn diagram.

A number is chosen at random.

(a) Write down P (A ∩ B')

4

$\dfrac{1}{7}$

(2)

(b) Write down P (A' ∪ B')
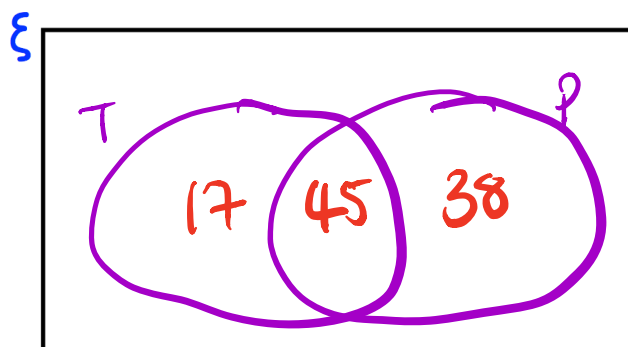
$\dfrac{5}{7}$

(2)

(c) Write down P (B | A)

$\dfrac{2}{3}$

(2)

12. A PE test has two sections, theory and practical.

Everyone in a class who took the PE test passed at least one section.
62% passes the theory section and 83% passed the practical section.

(a) Represent this information on a Venn diagram

$62 + 83 = 145$
$145 - 100 = 45$
$62 - 45 = 17$
$83 - 45 = 38$

ξ

T   P

17 (45) 38

(3)

A student is selected at random.

Work out the probability that this person

(a) passed the theory section, given they passed the practical section.

$\dfrac{45}{83}$

(2)

(b) passed the practical section, given they passed only one section.
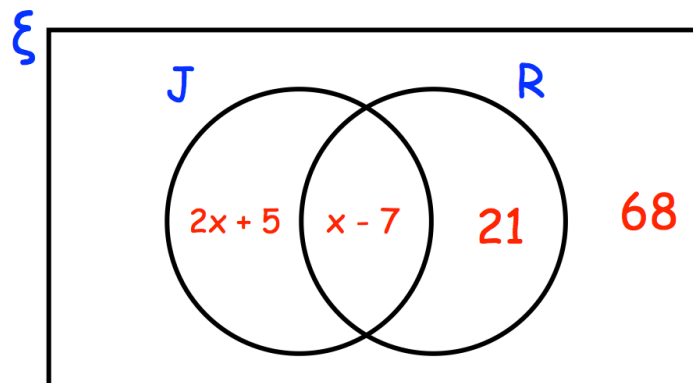
$17 + 38 = 55$

$\dfrac{38}{55}$

(2)

13.   The Venn diagram shows information about the cars in a car park.

ξ = 150 cars in the car park
R = red cars
J = cars manufactured in Japan

ξ

| J | | | R |
| 2x + 5 | x - 7 | 21 | 68 |

A car is chosen at random.
Work out the probability that it is red.

$$[2x+5] + [x-7] + 21 + 68 = 150$$
$$3x + 87 = 150$$
$$3x = 63$$
$$x = 21$$

$$P(R) = \frac{[x-7] + 21}{150}$$

$$P(R) = \frac{(21-7) + 21}{150}$$

$$P(R) = \frac{35}{150}$$

$$\frac{35}{150} \quad \left(\frac{7}{30}\right)$$
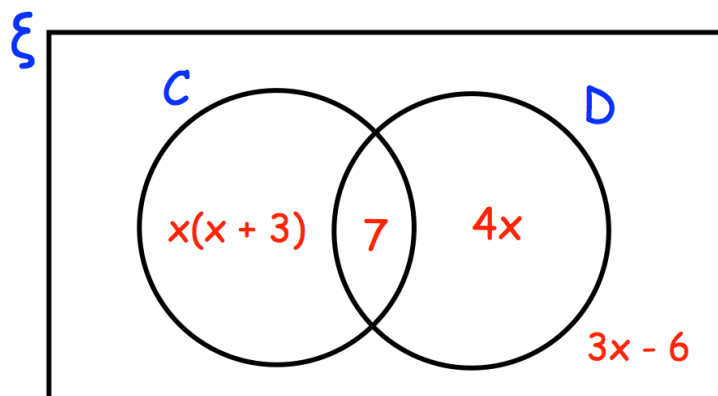
....
(4)

14. The Venn diagram shows information about the pets owned by 40 students

ξ = 40 students
C = students who own a cat
D = students who own a dog

ξ

C   D

x(x + 3)   7   4x

3x − 6

A student is chosen at random.
They own a cat.
Work out the probability that they own a dog.

$$x(x+3) + 7 + 4x + (3x - 6) = 40$$

$$x^2 + 3x + 7 + 4x + 3x - 6 = 40$$

$$x^2 + 10x - 39 = 0$$

$$(x + 13)(x - 3) = 0$$

$$\cancel{x = -13} \qquad x = 3$$

$$P(dog) = \frac{7 + 4x}{40}$$

$$P(dog) = \frac{7 + 12}{40} = \frac{19}{40}$$

$$\frac{19}{40}$$

(5)