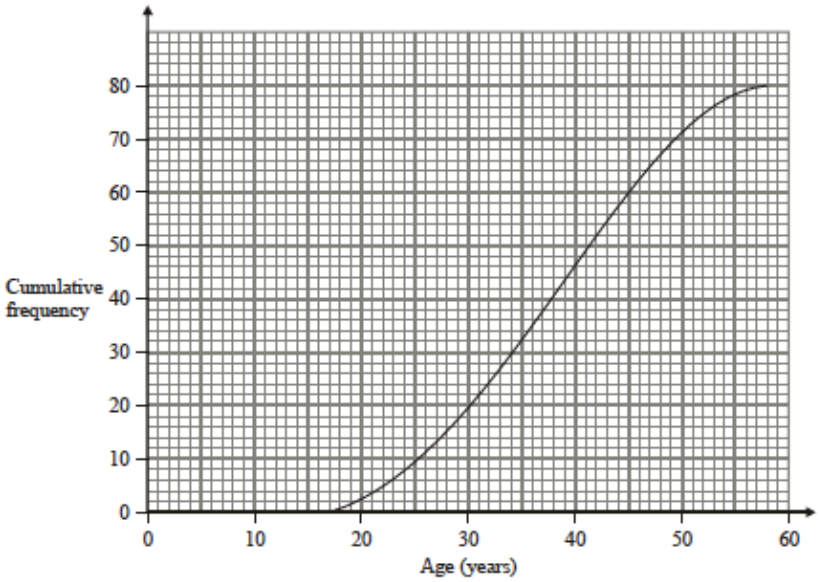
Mock Revision B (F4 only) [51]

1.

The ages of 80 workers in a factory are represented by the cumulative frequency diagram.
The youngest worker is 17 and the oldest is 57.



(a) Those workers who were aged 50 or over were offered early retirement.
Use the cumulative frequency diagram to estimate how many workers were offered early retirement.

(2)

(b) Use the information in the diagram to draw a box plot.

(3)

(Total 5 marks)

2.

(a) Expand and simplify $(x + y)(x - y)$

(2)

(b) (i) Factorise $x^2 - 13x + 36$

(2)

(ii) Hence, or otherwise, solve the equation $x^2 - 13x + 36 = 0$

(1)

(Total 5 marks)

3.

The area of the screen of a television set is A square inches.
The length of the diagonal of the screen is d inches.
A is directly proportional to the square of d.

A television set with an area of 90 square inches has a diagonal of length 15 inches.

(a) Find an equation connecting A and d.

(3)

(b) Find the area of the screen of a television set with a diagonal of length 20 inches.

(1)

(c) Another television set has a screen with an area of 250 square inches.

Find the length of its diagonal.

(3)

(Total 7 marks)

4.

(a) Here are the first four terms of a sequence.

$u_1 = 1 \qquad u_2 = \sqrt{3} \qquad u_3 = 3 \qquad u_4 = 3\sqrt{3}$

Find the terms u_6, u_9 *and* u_{21}.

(b) Here are the first four terms of a quadratic sequence.

$w_1 = 6 \qquad w_2 = 14 \qquad w_3 = 28 \qquad w_4 = 48$

The nth term is $w_n = an^2 + bn + c$.

Find the values of a, b and c.

(Total 7 marks)

5.

Dan believes he knows what his brother Ethan is thinking.
He carries out an experiment to test this.

Dan and Ethan sit back-to-back.
Ethan rolls an ordinary fair dice.
Ethan then thinks about the number on the dice while Dan tries to predict this number.

(a) In 300 attempts, how many correct predictions would you expect Dan to make if he was just guessing?

(b) The results of the first 15 attempts are shown in the table.

Ethan's number	2	6	5	3	2	1	5	1	3	4	4	6	1	6	5
Dan's prediction	2	4	3	1	2	6	1	6	4	3	2	6	5	2	3
Matching pair	✓				✓							✓			

Estimate the probability of getting a matching pair using the results of

(i) the first five attempts,

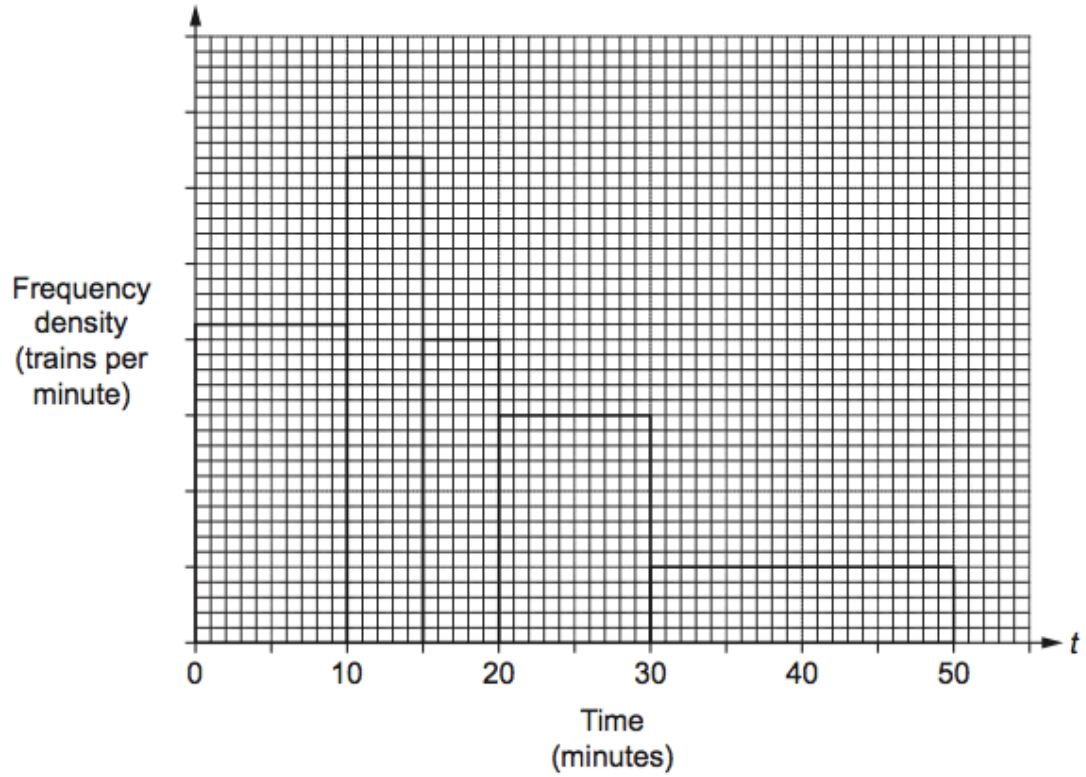
(ii) all 15 attempts.

(c) Use answers from **(a)** and **(b)** to comment on Dan's belief that he knows what Ethan is thinking.

(Total 6 marks)

6.

The histogram shows information about the times, in minutes, that trains arrived late at a station one day.



(a) David says that the range of times these trains arrived late is actually 48 minutes.

Could he be correct? Explain your reasoning.

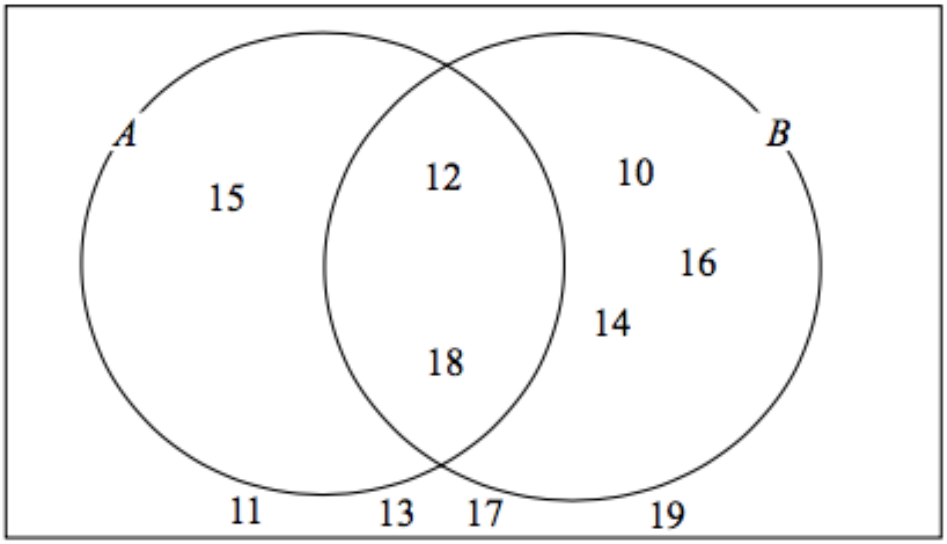
(b) 10 of these trains were between 30 minutes and 50 minutes late on that day.

Work out the number of trains that were at most 15 minutes late.

(Total 4 marks)

7. **Non-calculator**

Here is a Venn diagram.



(a) Write down the numbers that are in set

(i) $A \cup B$

(ii) $A \cap B$

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

(b) Find the probability that the number is in set A'

(Total 4 marks)

8.

Mark has made a clay model.
He will now make a clay statue that is mathematically similar to the clay model.

The model has a base area of $6\,cm^2$
The statue will have a base area of $253.5\,cm^2$

Mark used 2kg of clay to make the model.

Clay is sold in 10kg bags.
Mark has to buy all the clay he needs to make the statue.

How many bags of clay will Mark need to buy?

(Total 3 marks)

9.

An examiner has to attend a meeting in Manchester.
The probabilities of dry weather (**D**), rain (**R**) or snow (S) are

$$\text{Probability (D)} = \frac{1}{2}$$

$$\text{Probability (R)} = \frac{1}{3}$$

$$\text{Probability (S)} = \frac{1}{6}$$

If it is dry the probability that he will arrive in time for the meeting is $\frac{4}{5}$

If it rains the probability that he will arrive in time for the meeting is $\frac{2}{5}$

If it snows the probability that he will arrive in time for the meeting is $\frac{1}{10}$

Calculate the probability that he is **late** for the meeting.

(Total 4 marks)

10.

The table shows the weights of 100 children in year 7.
An estimate of the mean weight of the children is calculated as 44 kg.

Calculate the values of a and b.

Weight, w (kg)	**Frequency**
$20 < w \leq 30$	12
$30 < w \leq 40$	21
$40 < w \leq 50$	38
$50 < w \leq 60$	a
$60 < w \leq 70$	b

(Total 6 marks)