Mathematics test

Paper 2
Calculator allowed

Please read this page, but do not open the booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below. If you have been given a pupil number, write that also.

First name _____

Last name _____

School _____

Pupil number

Remember

- The test is 1 hour long.

- You may use a calculator in this test.

- You will need: pen, pencil, rubber, ruler, a pair of compasses, an angle measurer or protractor and a scientific or graphic calculator.

- Some formulae you might need are on page 2.

- This test starts with easier questions.

- Try to answer all the questions.

- Write all your answers and working on the test paper – do not use any rough paper.

- Check your work carefully.

- Ask your teacher if you are not sure what to do.

For marker's use only	Total marks	
	Borderline check	

Instructions

Answers

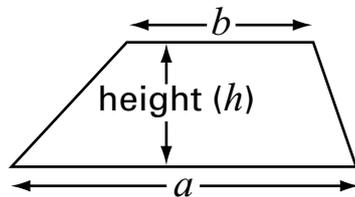This means write down your answer or show your working and write down your answer.

Calculators

You **may** use a calculator to answer any question in this test.
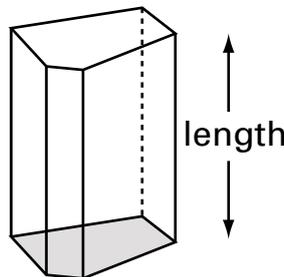
Formulae

You might need to use these formulae.

Trapezium

Area $= \dfrac{(a + b)}{2} \times h$

Prism

Volume = area of cross-section × length

1. A drink from a machine costs **55p**

The table shows the coins that were put into the machine one day.

Coins	Number of coins
50 p	31
20 p	22
10 p	41
5 p	59

How many cans of drink were sold that day?

Show your working.

. . . . cans

. . . .
3 marks

2. You can work out the cost of an advert in a newspaper by using this formula:

$$C = 15n + 75$$

C is the cost in pounds
n is the number of words in the advert

(a) An advert has **18 words**.

Work out the cost of the advert.
Show your working.

£

. . . .
. . . .
2 marks

(b) The cost of an advert is **£615**

How many words are in the advert?
Show your working.

. . . . words

. . . .
. . . .
2 marks

3. (a) A coach travels **300 miles** at an average speed of **40 mph**.

For how many hours does the coach travel?

. . . . hours

(b) An aeroplane flies **1860 miles** in **4 hours**.

What is its average speed?

. . . . mph

(c) A bus travels for $2\frac{1}{2}$ **hours** at an average speed of **24 mph**.

How far does the bus travel?

. . . . miles

4.　　A trundle wheel is used
to measure distances.

Imran makes a trundle wheel,
of **diameter 50 cm**.

(a)　Calculate the **circumference** of Imran's trundle wheel.

Show your working.

. . . . cm

2 marks

(b)　Imran uses his trundle wheel to measure the length of the school car park.

His trundle wheel rotates **87 times**.

What is the **length** of the car park, to the **nearest metre**?

. . . . m

1 mark

5. Draw lines to join any pairs of algebraic expressions that will always have the **same value** when $a = b = c$

ab

$3c$

$3c - 2b$

$2c + b$

$2a$

. . . .

. . . .

a^2

$a + c$
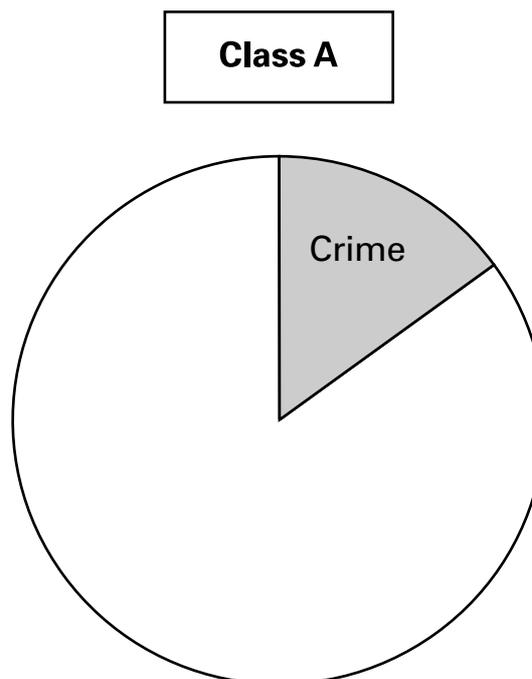
. . . .

3 marks

6.   A teacher asked two different classes:

'What type of book is your favourite?'

(a)   Results from **class A** (total 20 pupils):

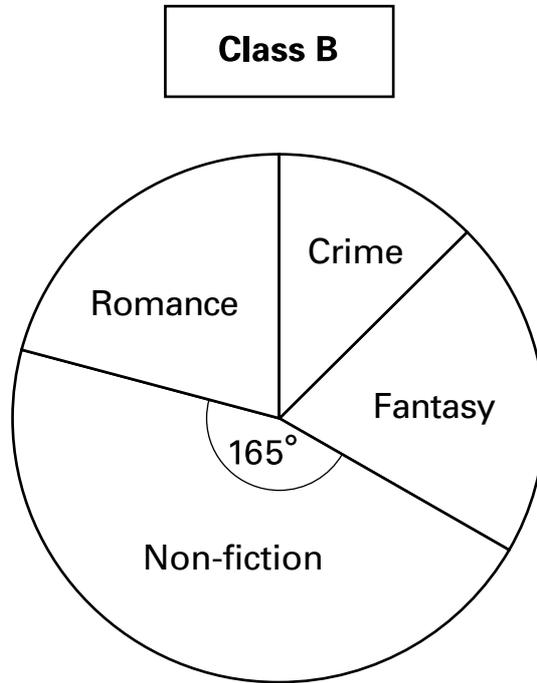| Type of book	Frequency
Crime	3
Non-fiction	13
Fantasy	4

Complete the pie chart to show this information.

Show your working and draw your angles accurately.

Class A

. . . .

. . . .

2 marks

(b) The pie chart below shows the results from all of **class B.**

Each pupil had only one vote.

Class B

Crime

Romance

Fantasy

165°

Non-fiction

The sector for **Non-fiction** represents **11 pupils**.

How many pupils are in class B?

Show your working.

. . . . pupils

. . . .

. . . .

2 marks

7. (a) The label on yoghurt A shows this information.

How many grams of **protein** does **100 g** of yoghurt provide?

Show your working.

Yoghurt A **125 g**	
Each 125 g provides	
Energy	430 kJ
Protein	4.5 g
Carbohydrate	11.1 g
Fat	4.5 g

. . . . . . g

2 marks

(b) The label on yoghurt B shows different information.

A boy eats the same amount of yoghurt A and yoghurt B.

Which yoghurt provides him with more **carbohydrate**?
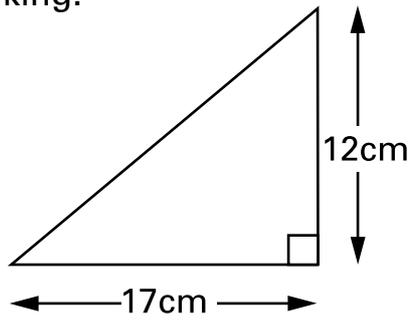
Show your working.

Yoghurt B **150 g**	
Each 150 g provides	
Energy	339 kJ
Protein	6.6 g
Carbohydrate	13.1 g
Fat	0.2 g

2 marks

8. (a) Calculate the length of the unknown side of this right-angled triangle.
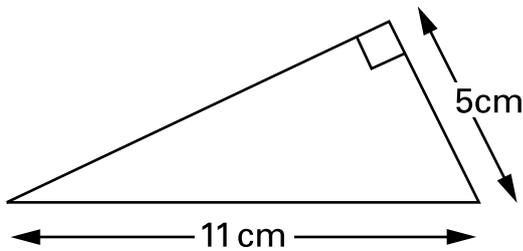Show your working.

12cm

Not drawn accurately

17cm

. . . . cm

. . . .
. . . .
2 marks

(b) Calculate the length of the unknown side of the right-angled triangle below.
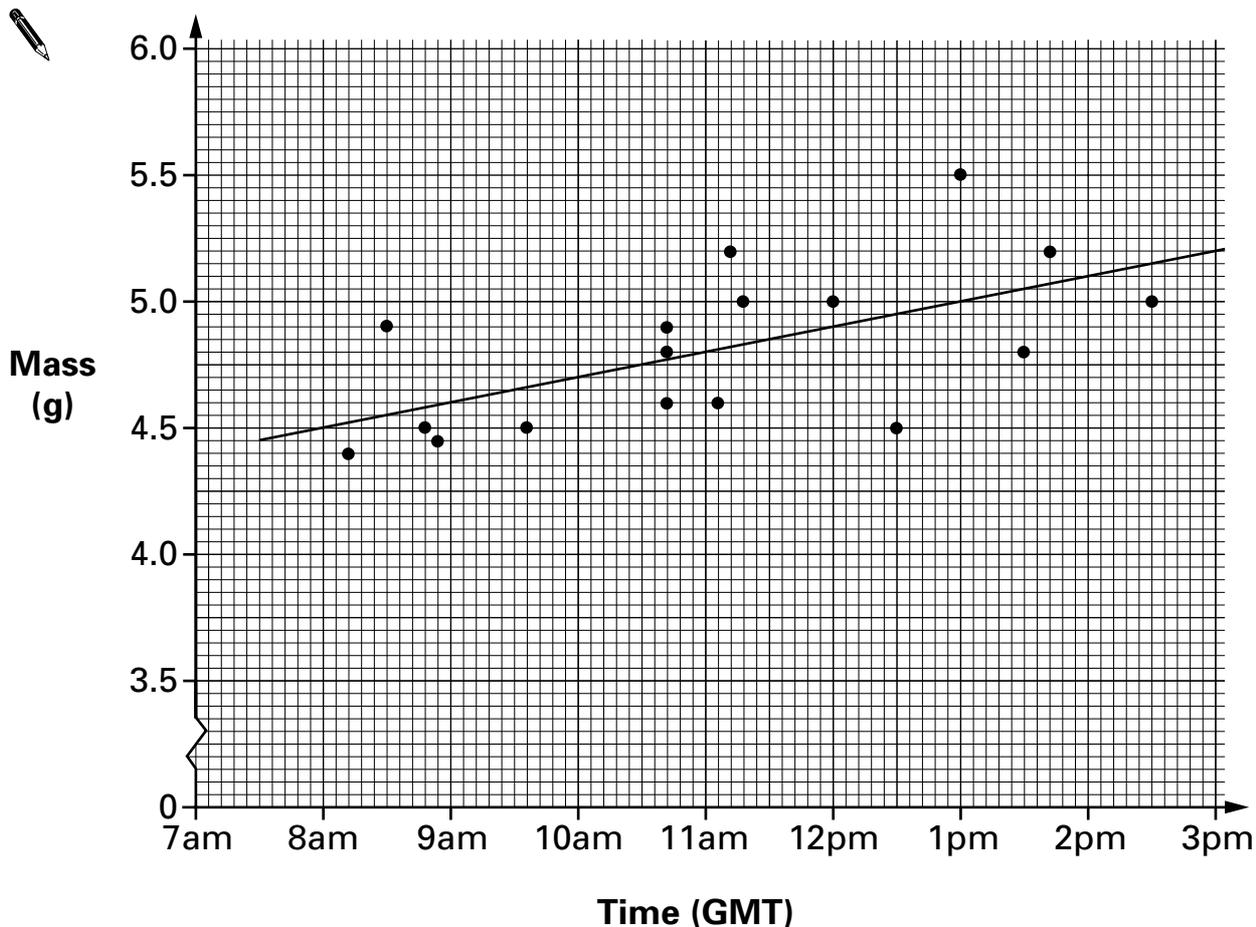Show your working.

5cm

Not drawn accurately

11 cm

. . . . cm

. . . .
. . . .
2 marks

9. The goldcrest is Britain's smallest species of bird.

On winter days, a goldcrest must eat enough food to keep it warm at night. During the day, the mass of the bird increases.

The scatter diagram shows the mass of goldcrests at different times during winter days. It also shows the line of best fit.

(a) Estimate the mass of a goldcrest at **11:30 am**.

. . . . . . g

1 mark

(b) Estimate how many grams, on average, the mass of a goldcrest **increases** during **one hour**.

. . . . g

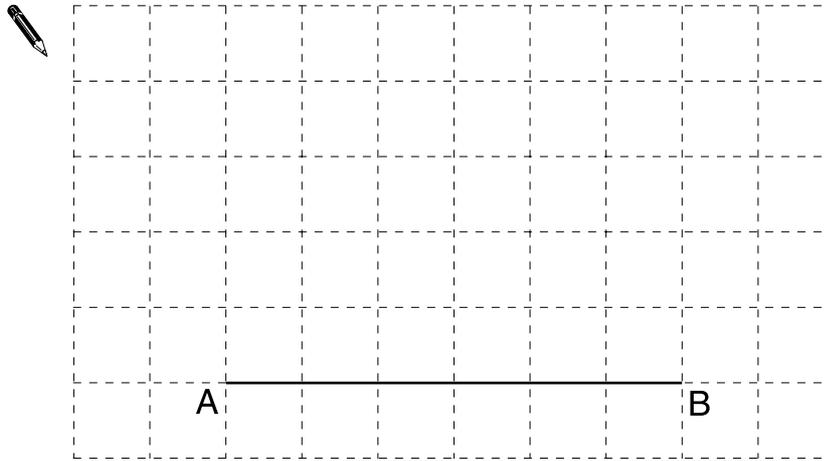(c) Which goldcrest represented on the scatter diagram is **least likely** to survive the night if it is cold?

Show your answer by circling the correct point on the scatter diagram, then explain why you chose that point.

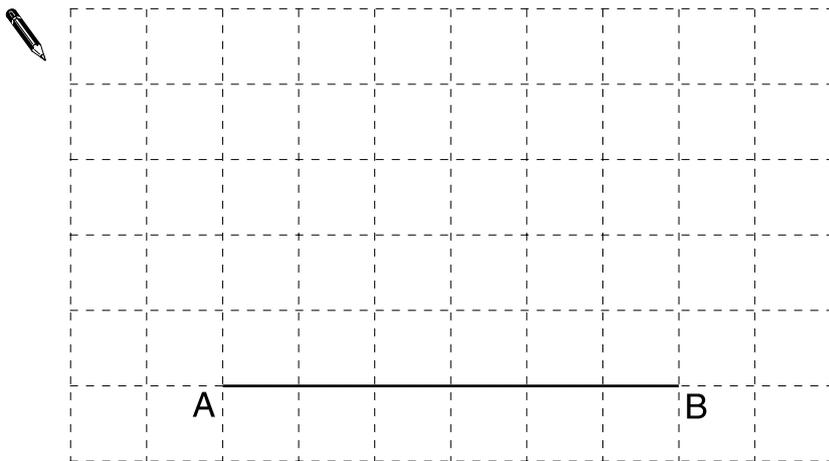**10.** (a) On the cm^2 grid below, draw a **right-angled triangle** with an area of **12 cm^2**

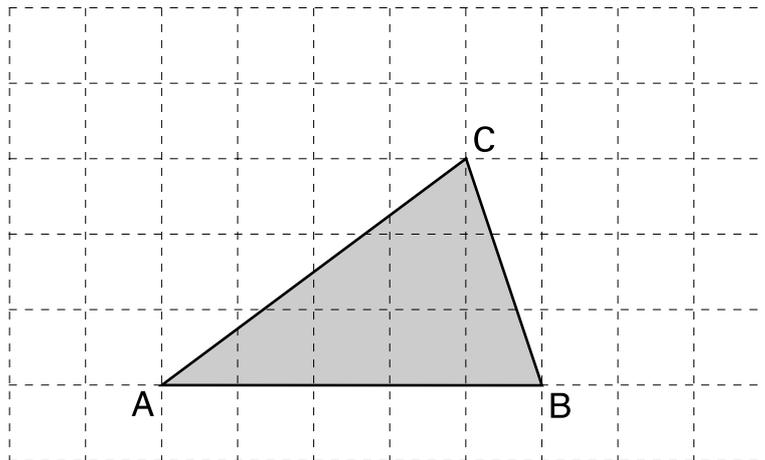Use line AB as one side of the triangle.

A   B

(b) Now draw an **isosceles triangle** with an area of **12 cm^2**

Use line AB as one side of the triangle.

A   B

(c)   Use Pythagoras' theorem to prove that **AC** is the same length as **AB**

Show your working.

. . . .

. . . .
2 marks

(d)   Calculate the size of angle ABC
      Show your working.

. . . .

°
. . . .

. . . .
2 marks

11. A gardener wants to plant a tree.

She wants it to be **more than 8 m** away from the **vegetable plot**.
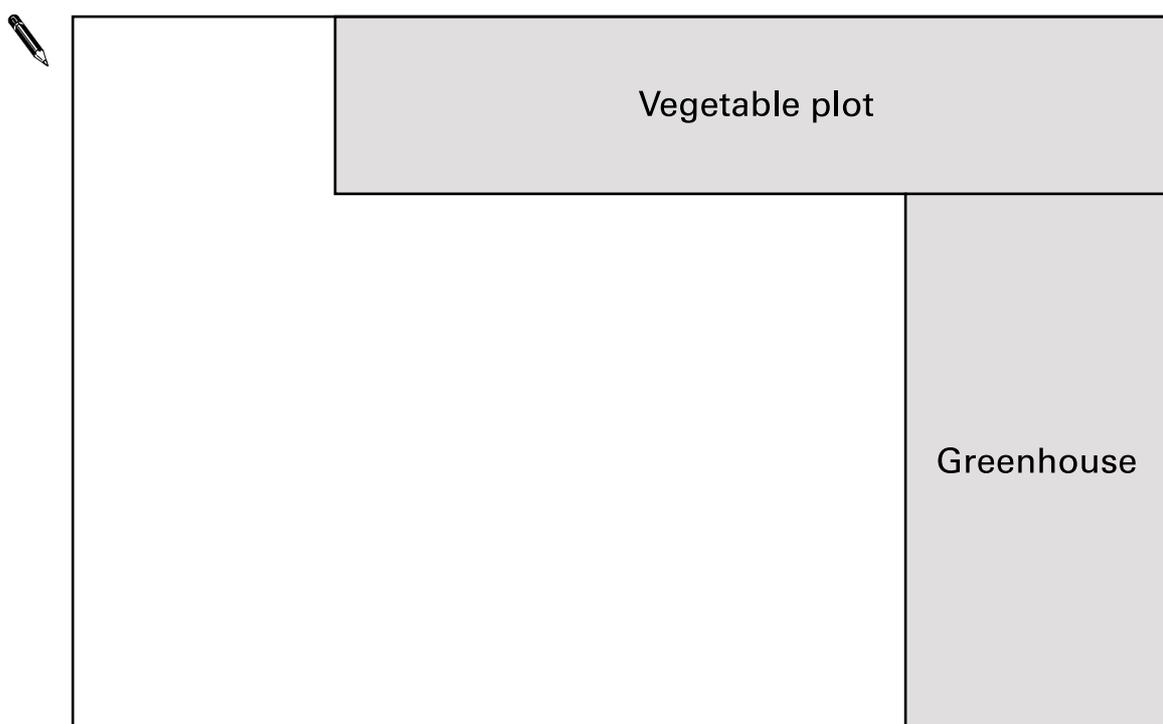
She wants it to be **more than 18 m** away from the **greenhouse**.

The plan below shows part of the garden.
The scale is **1 cm** to **4 m**.

Show **accurately** on the plan the region of the garden where she can plant the tree.

Label this region **R**.

. . . .

. . . .

. . . .
3 marks

12. The table shows the average weekly earnings for men and women in 1956 and 1998.

	1956	1998
Men	£11.89	£420.30
Women	£6.16	£303.70

(a) For **1956**, calculate the average weekly earnings for women as a percentage of the average weekly earnings for men.

Show your working and give your answer to 1 decimal place.

. . . . %

. . . .

. . . .

2 marks

(b) For **1998**, show that the average weekly earnings for women were a **greater proportion** of the average weekly earnings for men than they were in 1956.

. . . .

. . . .

2 marks

13.   A shop had a sale. All prices were reduced by 15%

<div style="float:right; border:1px solid; padding:10px">

Sale
15% off

</div>

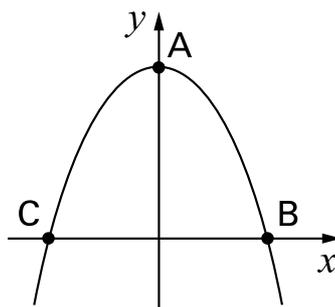A pair of shoes cost **£38.25** in the sale.

What price were the shoes before the sale?

Show your working.

£

2 marks

14. The diagram shows a sketch of the curve $y = 16 - x^2$

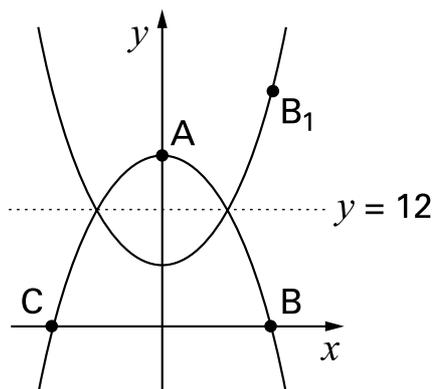(a) What are the coordinates of points A, B and C?

A (,) B (,) C (,)

. . . .
. . . .
2 marks

The curve $y = 16 - x^2$ is reflected in the line $y = 12$

(b) B_1 is the reflection of B

What are the coordinates of B_1?
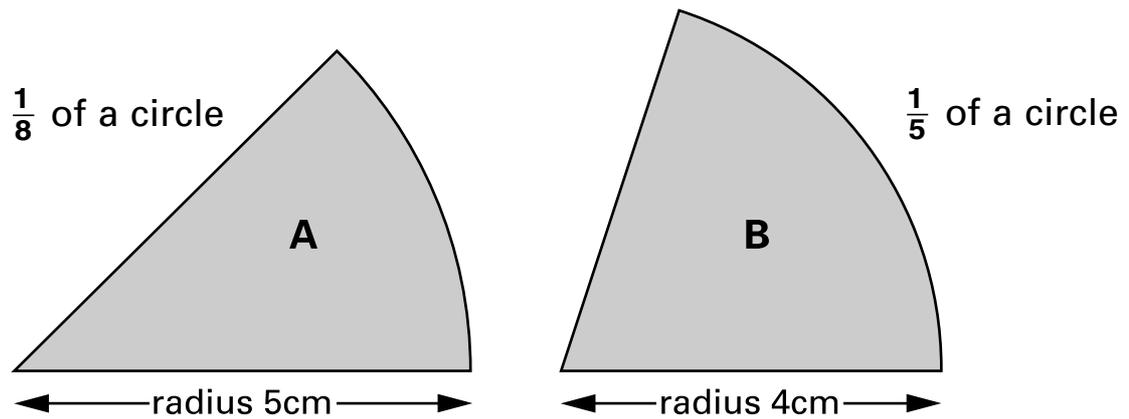
B_1 (,)

. . . .
1 mark

(c) What is the equation of the new curve?

. . . .
1 mark

15. The diagram shows parts of two circles, sector A and sector B

$\frac{1}{8}$ of a circle

A

←—radius 5cm—→

$\frac{1}{5}$ of a circle

B

←—radius 4cm—→

(a) Which sector has the **bigger area**?

Show working to explain your answer.

. . . .

. . . .
2 marks

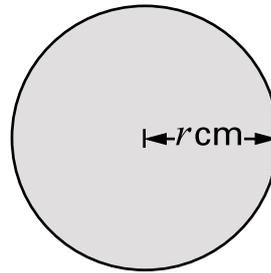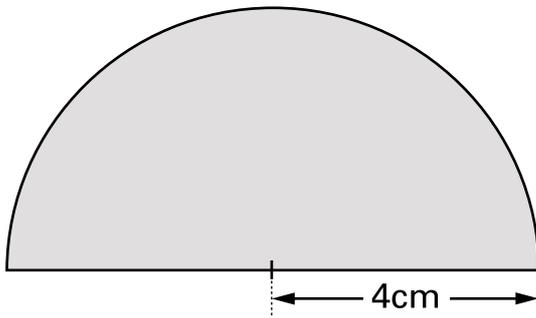(b) The perimeter of a sector is made from two straight lines and an arc.

Which sector has the **bigger perimeter**?

Show working to explain your answer.

. . . .

. . . .
2 marks

20

(c) A semi-circle, of radius 4 cm, has the **same area** as
     a complete circle of radius r cm.

Not drawn
accurately

What is the radius of the complete circle?

Show your working.

r = ... cm

. . . .

. . . .
2 marks

16. Each year a school has a concert of readings and songs.

In 1999 the concert had 3 readings and 9 songs.
It lasted 120 minutes.

In 2000 the concert had 5 readings and 5 songs.
It lasted 90 minutes.

In 2001 the school plans to have 5 readings and 7 songs.

Use simultaneous equations to estimate how long the concert will last.

Call the time estimated for a reading x minutes,
and the time estimated for a song y minutes.

You **must** show your working.

. . . .

. . . .

. . . .

Estimated time = ... minutes

. . . .
4 marks

END OF TEST

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