

Write your name here:

Surname:	Other Names:
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# Mathematics

## Practice Papers Set 2

### Paper 2 (Calculator)

### Higher Tier

## Time: 1 hour 30 minutes

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser

#### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– there may be more space than you need.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

#### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets  
– use this as a guide as to how much time to spend on each question.

#### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**1** There are 130 adults at a language school.  
Each adult studies one of French or Spanish or German.

96 of the adults are women.

12 of the women study French.

73 of the adults study Spanish.

55 of the women study Spanish.

9 of the men study German.

How many of the adults study French?

.....  
**(Total for Question 1 is 4 marks)**

2 The same type of computer is sold in two shops.

**Computer World**  
Beta computer  
Normal price : £359  
15% off normal price

**Logic**  
Beta computer  
Pay £110 now  
and pay 12 instalments  
of £16.80 per month

What is the difference in the cost of a Beta computer in Computer World and the cost of a Beta computer in Logic?

You must show all your working.

£ .....

**(Total for Question 2 is 4 marks)**

3 Ben goes on holiday to Hong Kong.

In Hong Kong, Ben sees a camera costing HK\$3179.55

In London, an identical camera costs £285

The exchange rate is £1 = HK\$12.30

Ben buys the camera in Hong Kong.

How much cheaper is the camera in Hong Kong than in London?

.....  
**(Total for Question 3 is 3 marks)**

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- 4 A plane flew from Frankfurt to Hong Kong.  
The flight time was 10 hours 45 minutes.  
The average speed was 852 km/h.

Work out the distance the plane flew.

..... km

**(Total for Question 4 is 3 marks)**

5

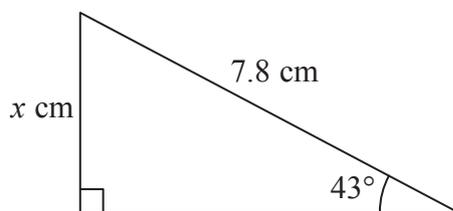


Diagram **NOT**  
accurately drawn

Work out the value of  $x$ .  
Give your answer correct to 3 significant figures.

$x =$  .....

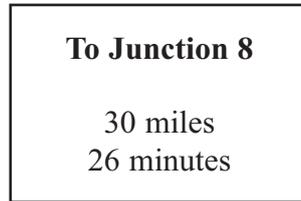
**(Total for Question 5 is 3 marks)**

6 Axel and Lethna are driving along a motorway.

They see a road sign.

The road sign shows the distance to Junction 8

It also shows the average time drivers will take to get to Junction 8



The speed limit on the motorway is 70 mph.

Lethna says,

‘We will have to drive faster than the speed limit to go 30 miles in 26 minutes.’

Is Lethna right?

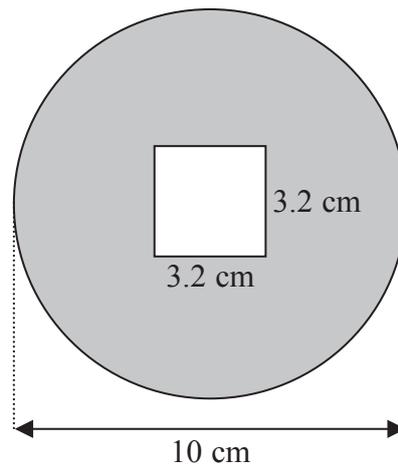
You must show how you got your answer.

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**(Total for Question 6 is 3 marks)**

7 A square hole is cut from a circular piece of card.

Diagram **NOT**  
accurately drawn



The square has sides of length 3.2 cm.  
The diameter of the circular piece of card is 10 cm.

Work out the area of the shaded region.  
Give your answer correct to 3 significant figures.

..... cm<sup>2</sup>

**(Total for Question 7 is 4 marks)**

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8 Express 825 as a product of its prime factors.

.....

**(Total for Question 8 is 3 marks)**

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9 In a sale normal prices are reduced by 20%.

A washing machine has a sale price of £464

By how much money is the normal price of the washing machine reduced?

£ .....

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**(Total for Question 9 is 3 marks)**

10 Given that  $y$  is positive, make  $y$  the subject of  $y = \sqrt{ay^2 + n}$

Show clear algebraic working.

$$y = \dots\dots\dots$$

**(Total for Question 10 is 5 marks)**

---

11 Given that  $(5 - \sqrt{x})^2 = y - 20\sqrt{2}$  where  $x$  and  $y$  are positive integers, find the value of  $x$  and the value of  $y$ .

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

**(Total for Question 11 is 3 marks)**

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12 (a)  $x = 9 \times 10^{2m}$  where  $m$  is an integer.

Find, in standard form, an expression for  $\sqrt{x}$

.....  
(2)

(b)  $y = 9 \times 10^{2n}$  where  $n$  is an integer.

Find, in standard form, an expression for  $y^{\frac{3}{2}}$

Give your answer as simply as possible.

.....  
(3)

---

(Total for Question 12 is 5 marks)

13 Anne, Bertie and Colin share some money.

The amounts that Anne and Bertie get are in the ratio 3:2.

The amounts that Bertie and Colin get are in the ratio 5:4.

In total they have £115.

How much does Colin get?

.....  
(Total for Question 13 is 3 marks)

14  $f$  is the function  $f(x) = 2x + 5$

(a) Find  $f(3)$

.....  
(1)

(b) Express the inverse function  $f^{-1}$  in the form  $f^{-1}(x) =$

$f^{-1}(x) =$  .....  
(2)

$g$  is the function  $g(x) = x^2 - 25$

(c) Find  $g(-3)$

.....  
(1)

(d) (i) Find  $gf(x)$   
Give your answer as simply as possible.

$gf(x) =$  .....

(ii) Solve  $gf(x) = 0$

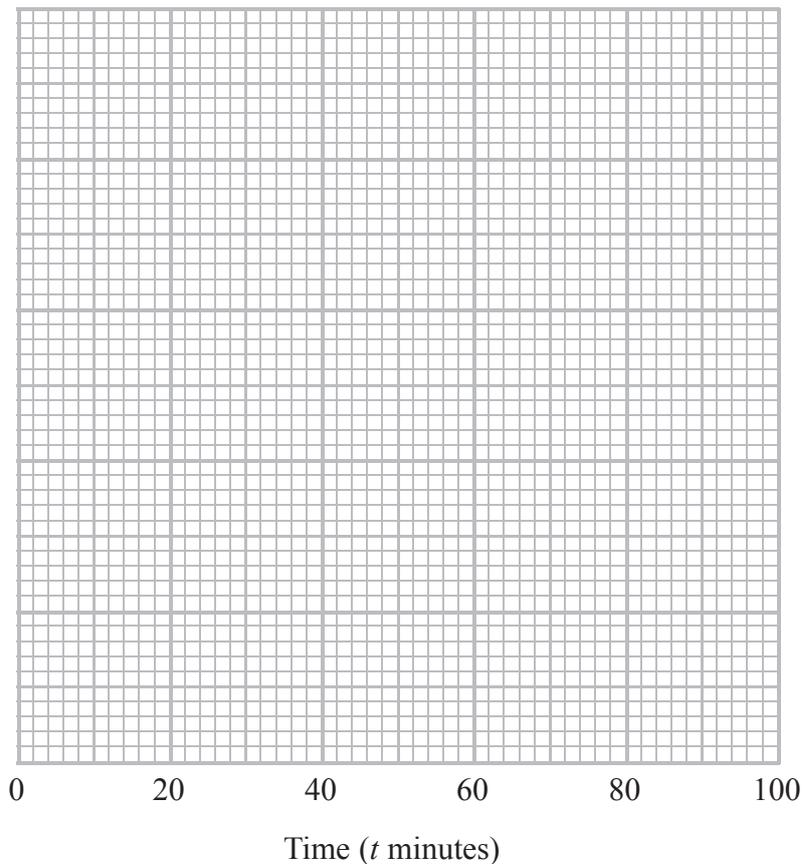
.....  
(5)

(Total for Question 14 is 9 marks)

- 15 The table gives information about the times, in minutes, spent by 212 adults using the internet one week.

Time spent ( $t$ minutes)	Frequency
$0 < t \leq 10$	20
$10 < t \leq 30$	58
$30 < t \leq 60$	102
$60 < t \leq 100$	32

- (a) Draw a histogram for this information.



(4)

- (b) Work out an estimate for the mean time spent using the internet by these adults.  
Give your answer correct to one decimal place.

.....  
(3)

**(Total for Question 15 is 7 marks)**

**16** Carlos wants to find an estimate for the number of ants in a colony.

He catches 60 ants from the colony and marks each one with a dye.  
He then returns the ants to the colony.

A week later, Carlos catches another 60 ants.  
8 of these ants are marked with the dye.

Work out an estimate for the number of ants in the colony.  
Write down an assumption you have made.

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.....

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**(Total for Question 16 is 3 marks)**

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17 The diagram shows triangle  $LMN$ .

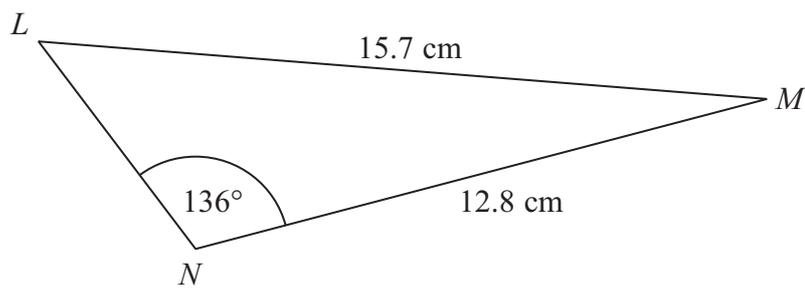


Diagram **NOT**  
accurately drawn

Calculate the length of  $LN$ .  
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 17 is 5 marks)

18

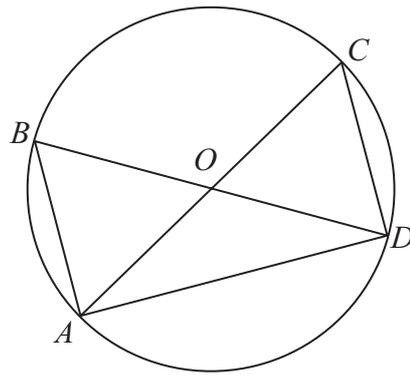


Diagram **NOT**  
accurately drawn

$AOC$  and  $BOD$  are diameters of a circle, centre  $O$ .

Prove that triangle  $ABD$  and triangle  $DCA$  are congruent.

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(Total for Question 18 is 3 marks)

**19** Solve the simultaneous equations

$$2x - y = 7$$

$$x^2 + y^2 = 34$$

Show clear algebraic working.

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**(Total for Question 19 is 7 marks)**