

CANDIDATE

## UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

mmn. \*trernep abers.com



INAIVIE					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 0580/23

Paper 2 (Extended) May/June 2010

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator Geome Mathematical tables (optional) Tracing

Geometrical instruments
Tracing paper (optional)

## **READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all questions.

If working is needed for any question it must be shown below that question.

Electronic calculators should be used.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For  $\pi$ , use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total of the marks for this paper is 70.

For Examiner's Use

1	During one we	ek in April, in	Quebec, the	daily minimu	m temperatures	s were		
	−5°C,	−1°C,	3°С,	2°С,	−2°C,	0°С,	6°C.	
	Write down							
	(a) the lowest	t of these temper	eratures,					
					Answer(a)		°C	[1]
	<b>(b)</b> the range	of these tempe	ratures.					
					Answer(b)		°C	[1]
2		$\sqrt{23}$	48%	4.80	$\frac{53}{11}$			
	Write the num	bers in order of	f size with th	ne <b>largest</b> firs	t.			
			Answer	>	>	> ,		[2]
3					nge rate was \$1 the exchange ra	= £0.60. ate was $$1 = £0.72$		
	How many dol	lars did he rece	eive?					
					Answer \$			[2]
4	The maximum	speed of a car	is 252 km/h					
	Change this sp	eed into metre	s per second					
					Answer		. m/s	[2]

5 Amalie makes a profit of 20% when she sells a shirt for \$21.60.

Calculate how much Amalie paid for the shirt.

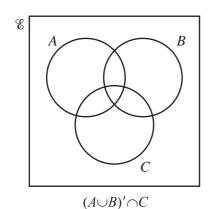
Answer \$	[2]

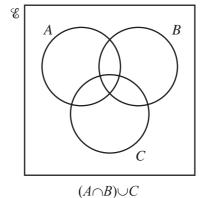
6  $3^x \times 9^4 = 3^n$ .

Find n in terms of x.

$$Answer n = [2]$$

7 Shade the required regions in the Venn diagrams below.





[2]

**8** Write as a single fraction in its simplest form

$$\frac{x}{3} + \frac{x-1}{2}.$$

Answer [2]

9	1 second	= 10 <sup>6</sup> microseco	nds.

For Examiner's Use

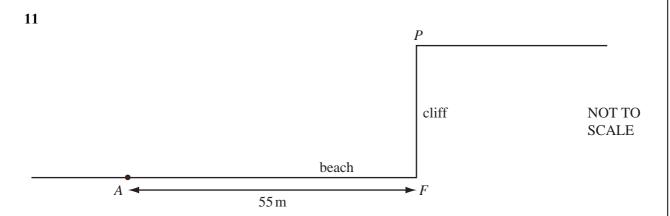
Change  $3 \times 10^{13}$  microseconds into minutes. Give your answer in standard form.

4		[2]
Answer	min	4

10 The length of each side of an equilateral triangle is 74 mm, correct to the nearest millimetre.

Calculate the smallest possible perimeter of the triangle.

Answer mm [2]



The diagram shows a point P at the top of a cliff.

The point F is on the beach and vertically below P.

The point A is 55m from F, along the horizontal beach.

The angle of elevation of P from A is 17°.

Calculate *PF*, the height of the cliff.

Answer PF = m [3]

12	Expand and simplify	2(x-3)	$n^2 - (2x)^2$	$-3)^{2}$
14	Expand and simplify	2(x-3)	-(2x)	-3).



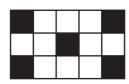
Answer	[3]
	 L

13 (a) Write down the number of lines of symmetry for the diagram below.



*Answer(a)* [1]

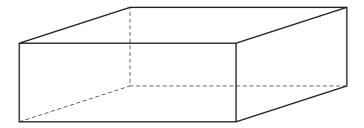
**(b)** Write down the order of rotational symmetry for the diagram below.



*Answer(b)* [1]

(c) The diagram shows a cuboid which has no square faces.

Draw one of the **planes** of symmetry of the cuboid on the diagram.



[1]

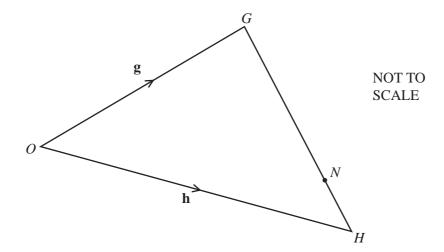
For Examiner's Use

14 Solve the equation

$$3(y-4) + \frac{y}{2} = 9.$$

Answer y = [3]

15



In triangle OGH, the ratio GN: NH = 3:1.

$$\overrightarrow{OG} = \mathbf{g}$$
 and  $\overrightarrow{OH} = \mathbf{h}$ .

Find the following in terms of g and h, giving your answers in their simplest form.

(a)  $\overrightarrow{HG}$ 

 $Answer(a) \overrightarrow{HG} =$  [1]

**(b)**  $\overrightarrow{ON}$ 

 $Answer(b) \ \overrightarrow{ON} =$  [2]

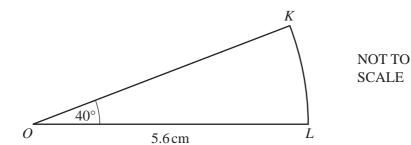
**16** Make *y* the subject of the formula.

$$A = \frac{r(y+2)}{5}$$

For Examiner's Use

Answer y = [3]

17



OKL is a sector of a circle, centre O, radius 5.6 cm. Angle  $KOL = 40^{\circ}$ .

Calculate

(a) the area of the sector,

Answer(a)  $\operatorname{cm}^2$  [2]

**(b)** the perimeter of the sector.

Answer(b) ..... cm [2]

$$f(x) = x^2 + 2$$

$$g(x) = (x+2)^2$$

$$h(x) = 3x - 5$$

For Examiner's Use

Find

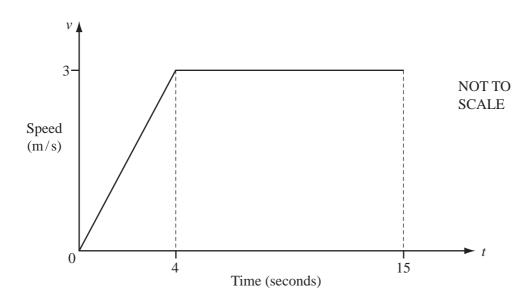
(a) gf(-2),

Answer(a) [2]

**(b)**  $h^{-1}(22)$ .

*Answer(b)* [2]

19



The diagram shows the speed-time graph for 15 seconds of the journey of a cyclist.

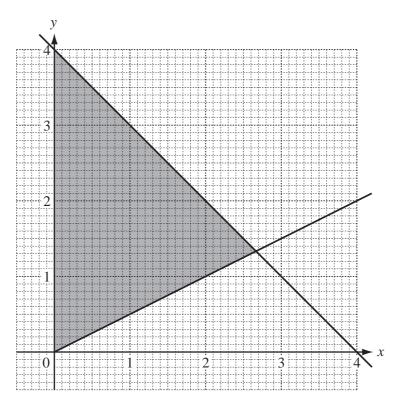
(a) Calculate the acceleration of the cyclist during the first 4 seconds.

Answer(a) .....  $m/s^2$  [1]

**(b)** Calculate the average speed for the first 15 seconds.

*Answer(b)* m/s [3]

For Examiner's Use

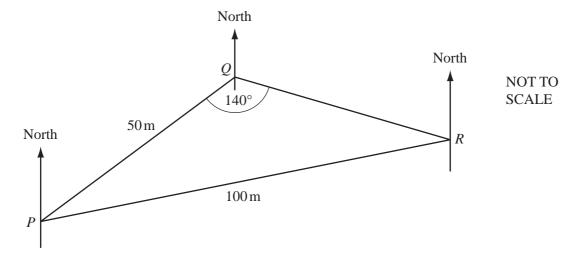


Find the three inequalities which define the shaded region on the grid.

Answer	

[5]

For Examiner's Use



The diagram shows three points P, Q and R on horizontal ground.

 $PQ = 50 \text{ m}, PR = 100 \text{ m} \text{ and angle } PQR = 140^{\circ}.$ 

(a) Calculate angle *PRQ*.

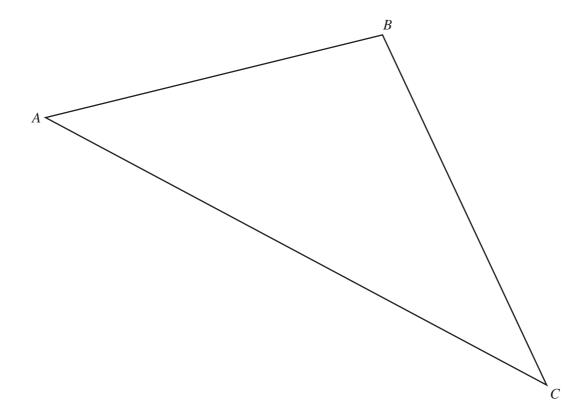
Answer(a) Angle PRQ = [3]

**(b)** The bearing of R from Q is  $100^{\circ}$ .

Find the bearing of P from R.

*Answer(b)* [2]

For Examiner's Use



The diagram shows a farmer's field ABC.

The farmer decides to grow potatoes in the region of the field which is

• nearer to A than to C

## and

• nearer to AB than to AC.

Using a straight edge and compasses only, construct two loci accurately and shade this region on the diagram.

[5]

Question 23 is printed on the next page.

$$\mathbf{A} = \begin{pmatrix} 1 & 4 \end{pmatrix}$$

$$\mathbf{A} = \begin{pmatrix} 1 & 4 \end{pmatrix} \qquad \qquad \mathbf{B} = \begin{pmatrix} 3 & -1 \\ -2 & 2 \end{pmatrix}$$

Examiner's Use

Find

(a) AB,

$$Answer(a) \mathbf{AB} = [2]$$

**(b)** the inverse matrix  $\mathbf{B}^{-1}$ ,

$$Answer(b) \mathbf{B}^{-1} = [2]$$

(c)  $BB^{-1}$ .

$$Answer(c) \mathbf{B}\mathbf{B}^{-1} = [1]$$

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.