



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
Cambridge Checkpoint

CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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MATHEMATICS

1112/02

Paper 2

April 2013

1 hour

Candidates answer on the Question Paper.

Additional Materials: Calculator
 Geometrical instruments

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 soft pencil for any diagrams, graphs or rough working.

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

DO NOT WRITE IN ANY BARCODES.

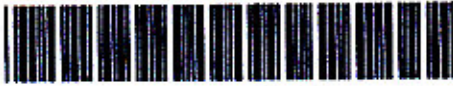
Answer **all** questions.

You should show all your working in the booklet.

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

The total number of marks for this paper is 50.

For Examiner's Use	
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Total	



1 Choose a suitable metric unit to measure each of the following.

the mass of a letter	kg, g
the height of a house	m, cm
the capacity of a bath	l, cm ³

[2]

2 Solve the equation

$$4b + 11 = 39$$

$$4b = 39 - 11$$

$$4b = 28$$

$$b = \underline{\quad 7 \quad} \dots\dots\dots [1]$$

3 A carpet costs \$15 per square metre.
The delivery charge is \$21

Peter buys n square metres.

Tick (✓) the expression which represents the total cost in \$.

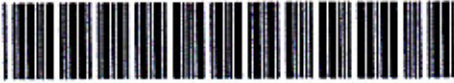
21($n + 15$)

15($n + 21$)

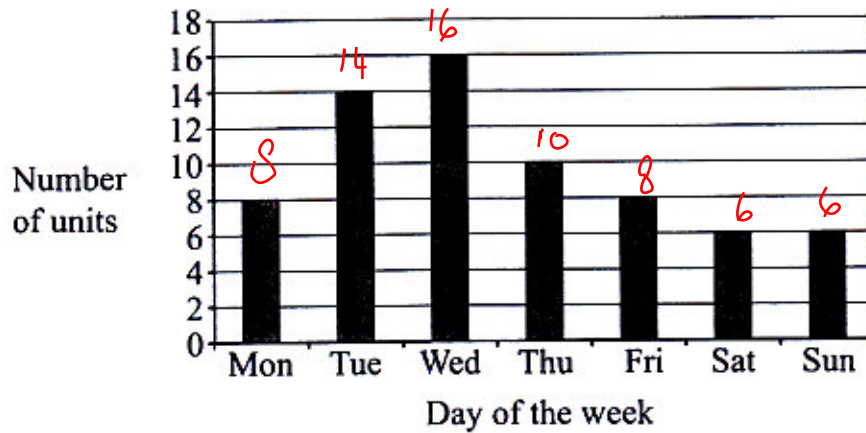
15 $n + 21$

21 $n + 15$

[1]



- 4 The chart shows the number of units of electricity produced each day of the week.



Over the seven days shown

- (a) Calculate the total number of units produced.

$$8 + 14 + 16 + 10 + 8 + 6 + 6 =$$

68

..... units

[1]

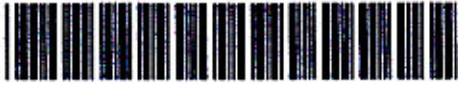
- (b) Calculate the mean number of units produced per day.

$$\frac{68}{7} = 9\frac{5}{7}$$

9 $\frac{5}{7}$

..... units

[1]



5 The table shows hourly rates of pay in a factory.

Day rate	Night rate
\$7.20 per hour	\$8.80 per hour

Sanjit works for 6 hours during the day on Monday and for 5 hours on Tuesday night.

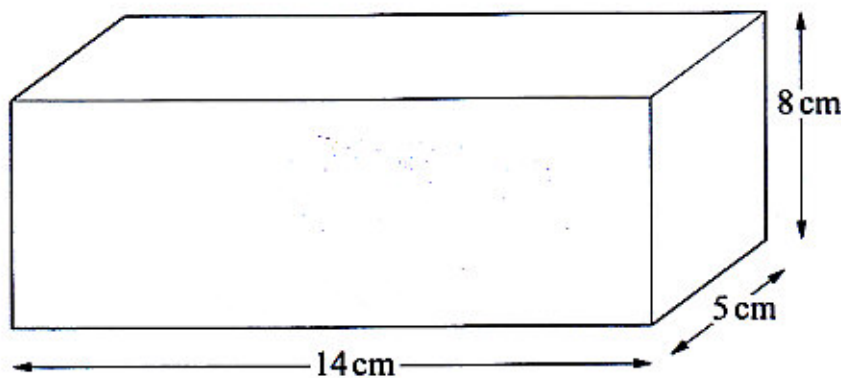
Calculate how much money Sanjit earns altogether.

$$= 6 \times \$ 7.2 + 5 \times \$ 8.8$$

$$= \$ 43.2 + \$ 44$$

\$ 87.2 [2]

6 A cuboid has dimensions 8 cm, 5 cm and 14 cm.



NOT TO SCALE

Find the volume of the cuboid.

$$V = 14 \times 5 \times 8$$

560

..... cm³ [1]



- 7 A teacher asks all the students in her class to write down an algebraic expression. Julie writes down this expression:

$$4n - 5$$

The expression that Jim writes down is:

$$2n + 14$$

What value of n makes the value of Julie's expression **equal** to the value of Jim's expression?

You must show your working.

$$4n - 5 = 2n + 14$$

$$4n - 2n = 14 + 5$$

$$2n = 19$$

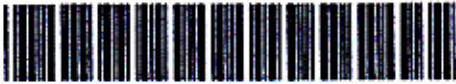
$$n = \underline{\hspace{10em} 9.5 \hspace{10em}} \quad [2]$$

- 8 Pupils in Grade 7 and Grade 8 can study either Arabic, Spanish or Mandarin.

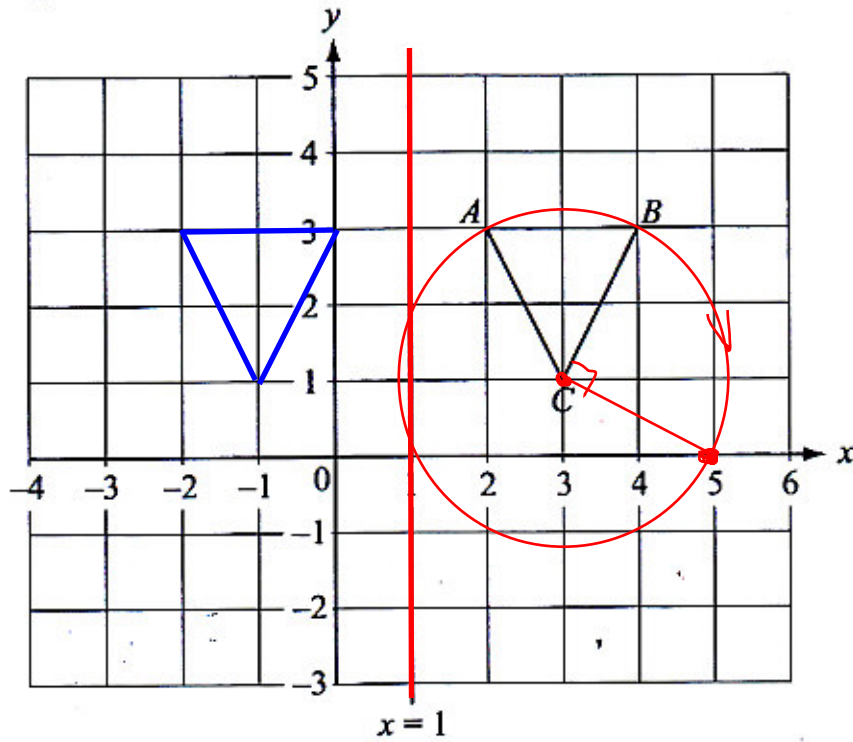
Complete the two-way table.

	Arabic	Spanish	Mandarin	Total
Grade 7	11	18	16	45
Grade 8	22	19	34	75
Total	33	37	50	120

[2]



9 Look at the diagram below.

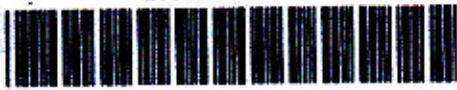


(a) Write down the co-ordinates of the point *B*.

(4 , 2) [1]

(b) The triangle *ABC* is reflected in the line $x = 1$ to give a new triangle *PQR*.

Draw the new triangle *PQR* on the diagram above. [2]



- (c) The original triangle ABC is rotated 90° clockwise about the point $(3, 1)$ to give another triangle.

Write down the co-ordinates of the new position of B .

(5 , 0) [1]

- (d) The diagram is drawn on a one centimetre grid.

Work out the area of the original triangle ABC .

$$\begin{aligned} \text{Area} &= \frac{b \times h}{2} \\ &= \frac{2 \times 2}{2} \end{aligned}$$

2 cm² [1]

- 10 Andy, Brian and Charlie share \$72 in the ratio 2:3:4

Work out how much Brian receives.

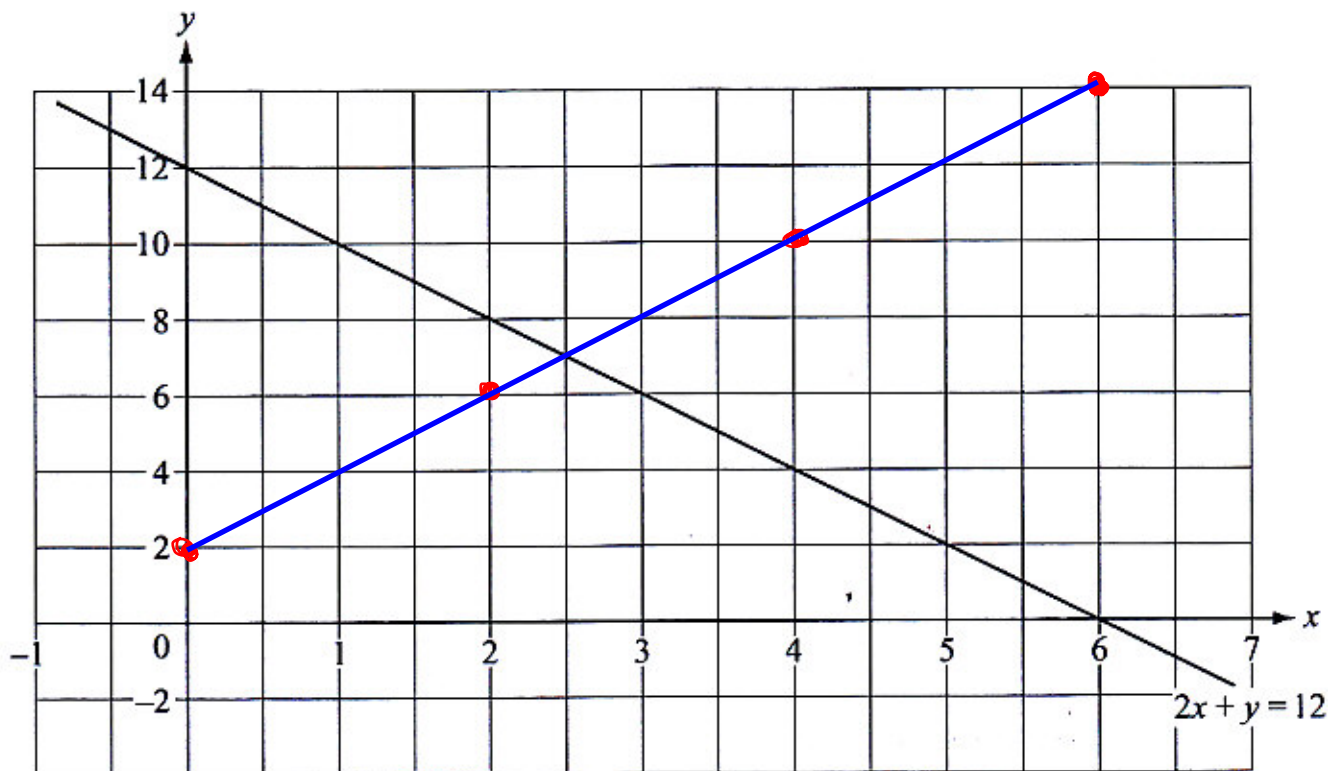
$$A : B : C = 2 : 3 : 4$$

$$B = \frac{3}{9} \times \$72$$

\$ 24 [2]



11 The grid shows the straight line with equation $2x + y = 12$



(a) Complete the table of values for $y = 2x + 2$

x	0	2	4	6
y	2	6	10	14

[1]

(b) Draw the line $y = 2x + 2$ on the grid.

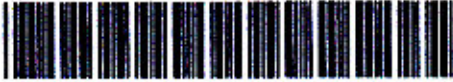
[1]

(c) Write down the solution to the simultaneous equations.

$$\begin{aligned}
 2x + y &= 12 \\
 y &= 2x + 2 \\
 \hline
 2x + 2x + 2 &= 12 \\
 4x &= 10 \\
 x &= 2.5 \\
 \hline
 2(2.5) + y &= 12 \\
 5 + y &= 12 \\
 y &= 7
 \end{aligned}$$

$x = 2.5$
 $y = 7$

[1]



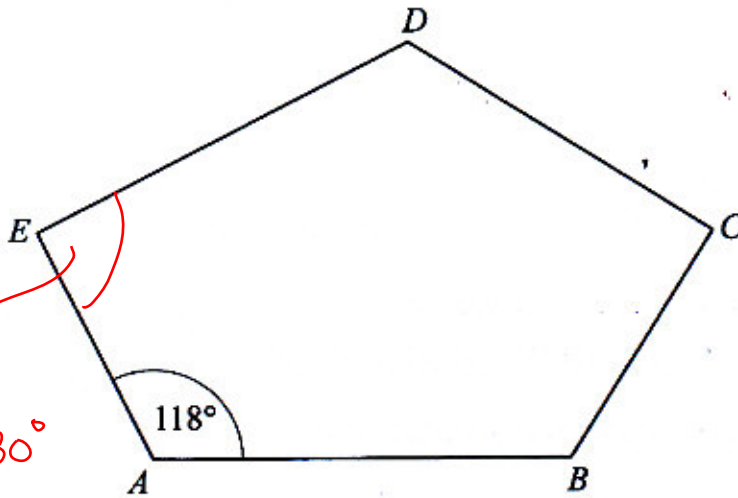
- 12 Tim thinks of a number.
His number rounded to 2 decimal places is 5.46

What is the **smallest** possible number Tim could have thought of?

5.455

[1]

- 13 The diagram shows a pentagon *ABCDE*.



NOT TO SCALE

Formula =
$$\frac{(n-2) \times 180^\circ}{n}$$

n is number of sides of polygon

Angle *EAB* = 118°

Explain how you can tell from the size of this angle that the pentagon is **not** regular.

Interior angle for regular pentagon
is
$$\frac{(5-2) \times 180}{5} = 108^\circ$$

[1]



14 Factorise

$$y^2 - 8y$$

$$y(y - 8)$$

[1]

15 A train leaves London at 08:55 and arrives in Peterborough at 09:35

(a) How long does the journey from London to Peterborough take in minutes?

$$\begin{array}{r} 09:35 \\ 08:55 - \\ \hline 40 \end{array}$$

40

minutes [1]

(b) The distance from London to Peterborough is 164 km.

Calculate the average speed of the train in km/h.

$$t = 40 \text{ min} = \frac{40}{60} = \frac{2}{3} \text{ h}$$

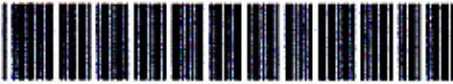
$$v = \frac{d}{t} = \frac{164 \text{ km}}{\frac{2}{3} \text{ h}}$$

246

km/h [2]

$$= 164 \times \frac{3}{2}$$

$$= 246$$



- 16 Kieran buys a car for \$8000
The following year he sells the car for \$7500

Find the percentage loss.



Loss if buy } sell

$$\text{Loss} = 8000 - 7500 = 1500$$

$$\begin{aligned} \% \text{ Loss} &= \frac{\text{Loss}}{\text{buy}} \times 100 \% \\ &= \frac{1500}{8000} \times 100 \% \end{aligned}$$

18.75

..... % [2]

- 17 Fill in the boxes.

$$(x+3) (\boxed{7} - \boxed{4}) = x^2 - x - 12$$

[1]

- 18 The distance from the Earth to the Sun is 92 868 000 miles.

Write this distance correct to 3 significant figures.

929 00000

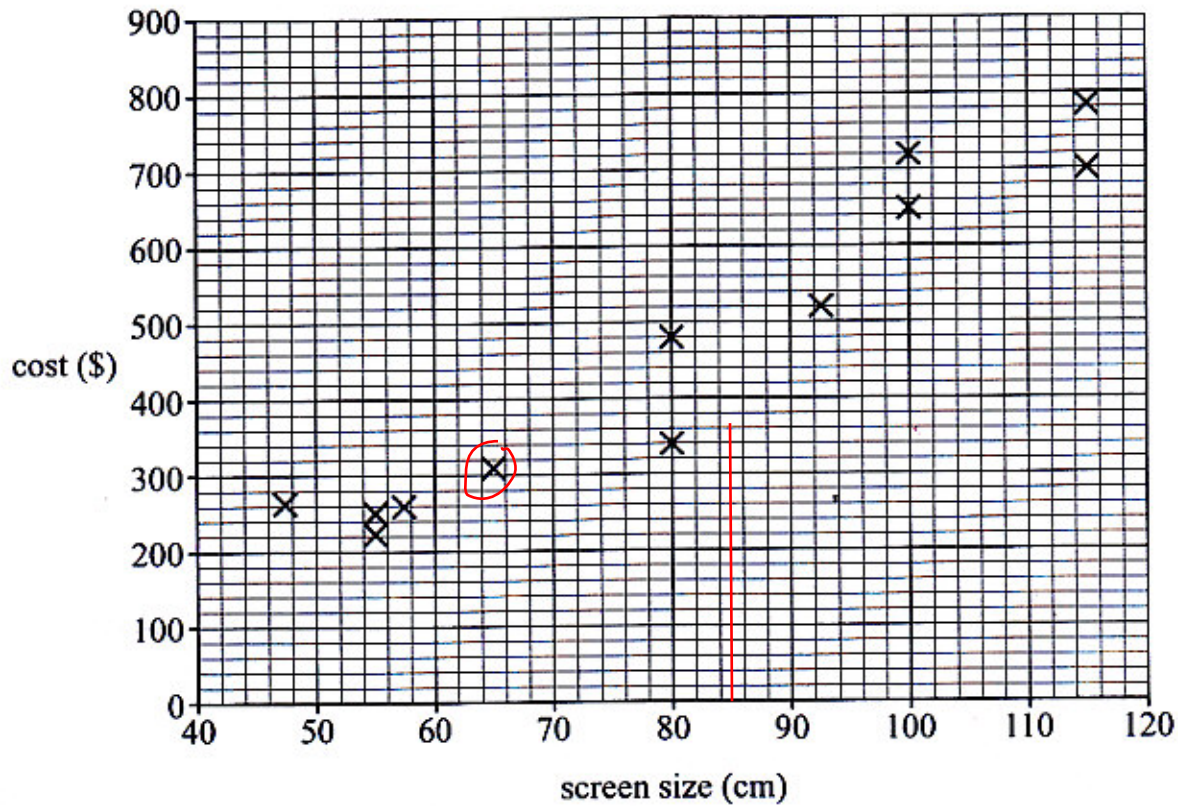
..... miles

[1]





19 A company makes 12 different types of television.
 The cost (in dollars) and screen size (in centimetres) of each type of television are shown in the scatter diagram.



(a) Write down the cost of the television which has a screen size of 65 cm.

\$ 310 [1]

(b) The company is introducing a new television with a screen size of 85 cm.

Put a ring around the cost that you think would be most appropriate for the new television.

\$320 \$530 \$690 \$800

Explain your answer.

.....
 [1]



20 Use a trial and improvement method to find an approximate solution to the equation

$$x^3 + 5x = 400$$

Start with $x = 7$

Give your answer to one decimal place.

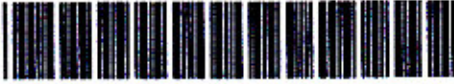
You must show all your working.

x	$x^3 + 5x$	
7	378	
8	552	
7.1	393.411	
7.2	409.248	

the result of $x^3 + 5x$ if $x = 7.1$

is the nearest to 400

$x = \underline{\quad 7.1 \quad}$ [4]



21 Two fair four sided dice numbered 1 to 4 are rolled and the scores are multiplied together.



(a) Complete the sample space diagram to show all the outcomes.

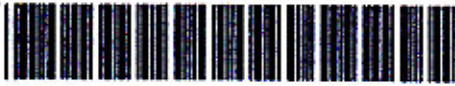
		Score on second dice			
		1	2	3	4
Score on first dice	1	1	2✓	3	4✓
	2	2✓	4✓	6✓	8✓
	3	3	6✓	9	12✓
	4	4✓	8✓	12✓	16✓

[1]

(b) What is the probability of obtaining an even outcome?

$$\frac{12}{16} = \frac{3}{4}$$

[1]



- 22 A baby elephant has a mass of 105 kg.
The elephant increases in mass by 95 kg per year.

Work out how many years it will take for the elephant's mass to increase to 2 tonnes.



Give your answer to the nearest year.

$$105 \quad 105+95 \quad \dots \dots \dots 2000$$

$$\rightarrow \frac{2000 - 105}{95} = 19.95 \sim 20 \text{ years}$$

..... 20 years [3]

- 23 A circular fish pond has an area of 20m^2

Calculate the **diameter** of the fish pond.

$$A = \pi r^2$$

$$r^2 = \frac{A}{\pi}$$

$$r = \sqrt{\frac{A}{\pi}}$$

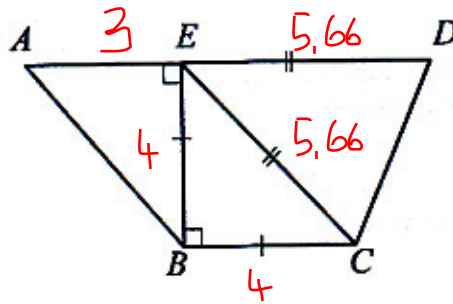
$$= \sqrt{\frac{20}{3.14}} = 2.5 \text{ m}$$

$$d = 2r$$

..... 5 m [3]



24 A trapezium is made up of triangles.



NOT TO
SCALE

Triangles ABE and BCE are right-angled triangles.
 Triangles CDE and BCE are isosceles triangles ($BC = BE$).
 $AE = 3$ cm and $EB = 4$ cm.

Work out the length of AD .

$$\begin{aligned} EC &= \sqrt{4^2 + 4^2} \\ &= \sqrt{16 + 16} \\ &= \sqrt{32} \\ &= 5.66 \text{ cm} \end{aligned}$$

$$\begin{aligned} AD &= AE + ED \\ &= 3 + 5.66 \\ &= 8.66 \end{aligned}$$

8.66

..... cm [3]