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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
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CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER					

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	

[Turn over

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

$$4b + 11 = 39$$

$4b = 39 - 11$

$4b = 28$

$b =$ 7 [1]

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

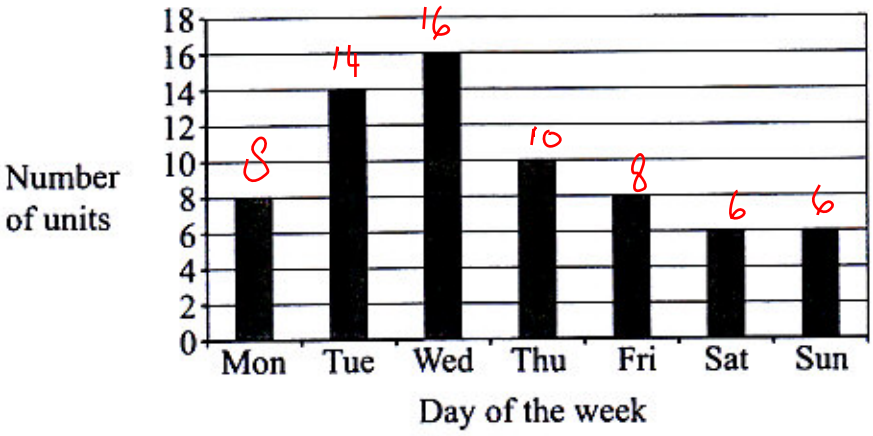
Peter buys n square metres.

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

$21(n + 15)$	☐
$15(n + 21)$	☐
$15n + 21$	☑
$21n + 15$	☐

[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.

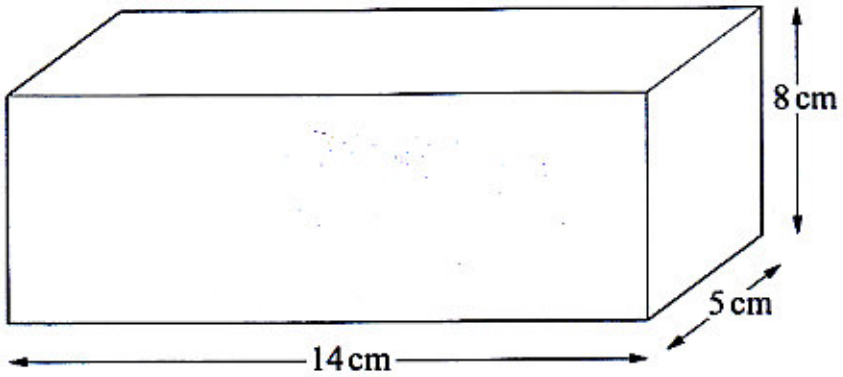
Calculate how much money Sanjit earns altogether.

= 6 × \$ 7.2 + 5 × \$ 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 × 5 × 8

560 cm^3 [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.

$4n - 5 = 2n + 14$

$4n - 2n = 14 + 5$

$2n = 19$

$n =$ 9.5 [2]

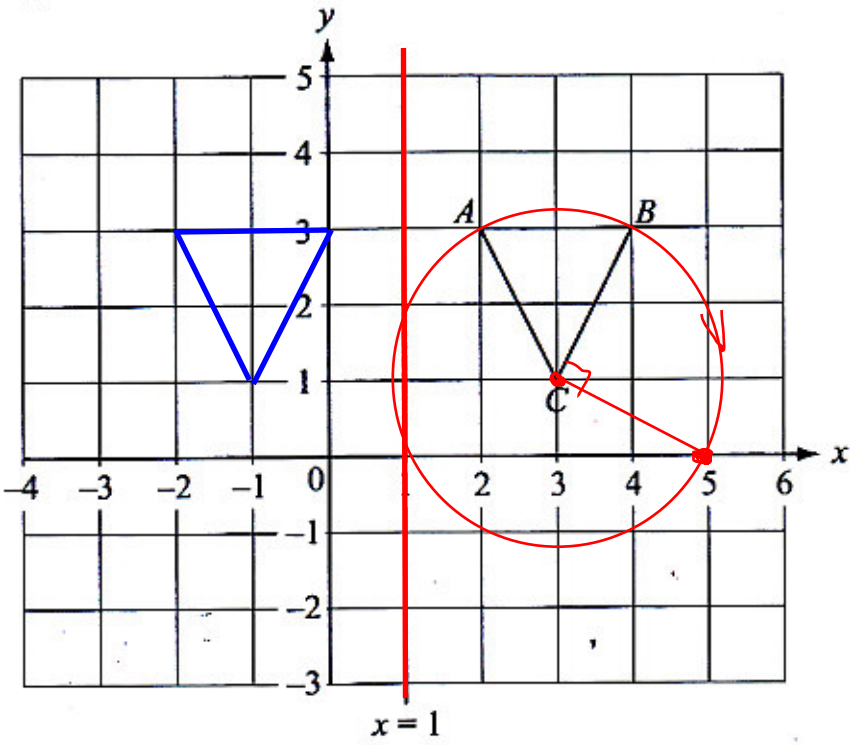
8 Pupils in Grade 7 and Grade 8 can study either Arabic, Spanish **or** Mandarin.

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*.

$$\text{Area} = \frac{b \times h}{2}$$

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

2 cm^2 [1]

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

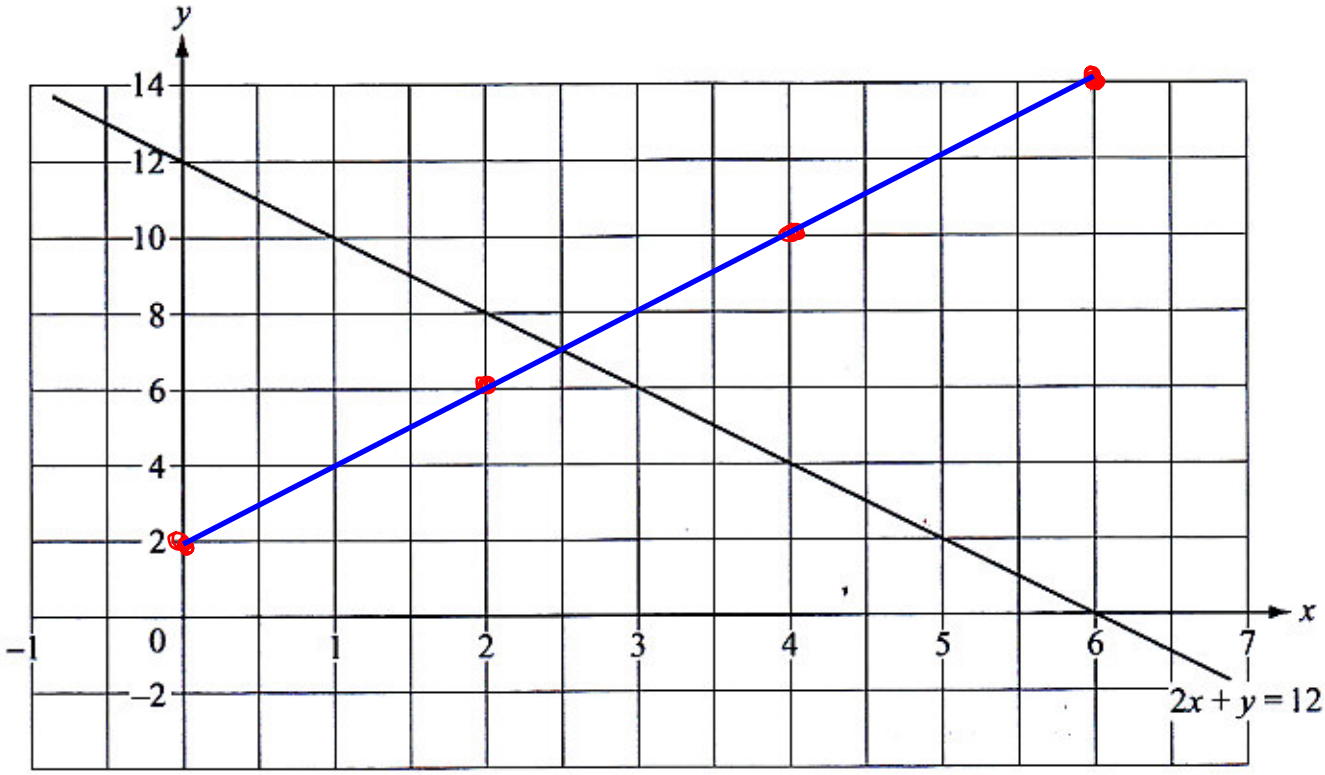
Work out how much Brian receives.

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.

$$2x + y = 12$$
$$y = 2x + 2$$

$\rightarrow y = 2(2.5) + 2 = 7$

$2x + 2x + 2 = 12$

$4x = 10$

$x = 2.5$

$x =$ 2.5

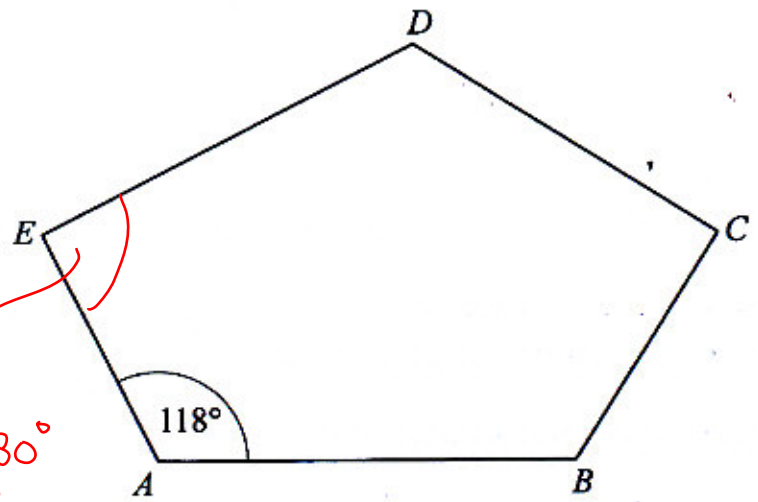
$y =$ 7 [1]

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.

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

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

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

$= 246$

246 km/h [2]

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

Find the percentage loss.

Loss if buy > sell

Loss = 8000 − 7500 = 1500

% Loss = $\frac{\text{Loss}}{\text{buy}} \times 100$ %

= $\frac{1500}{8000} \times 100$ %

18.75 ..... % [2]

17 Fill in the boxes.

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

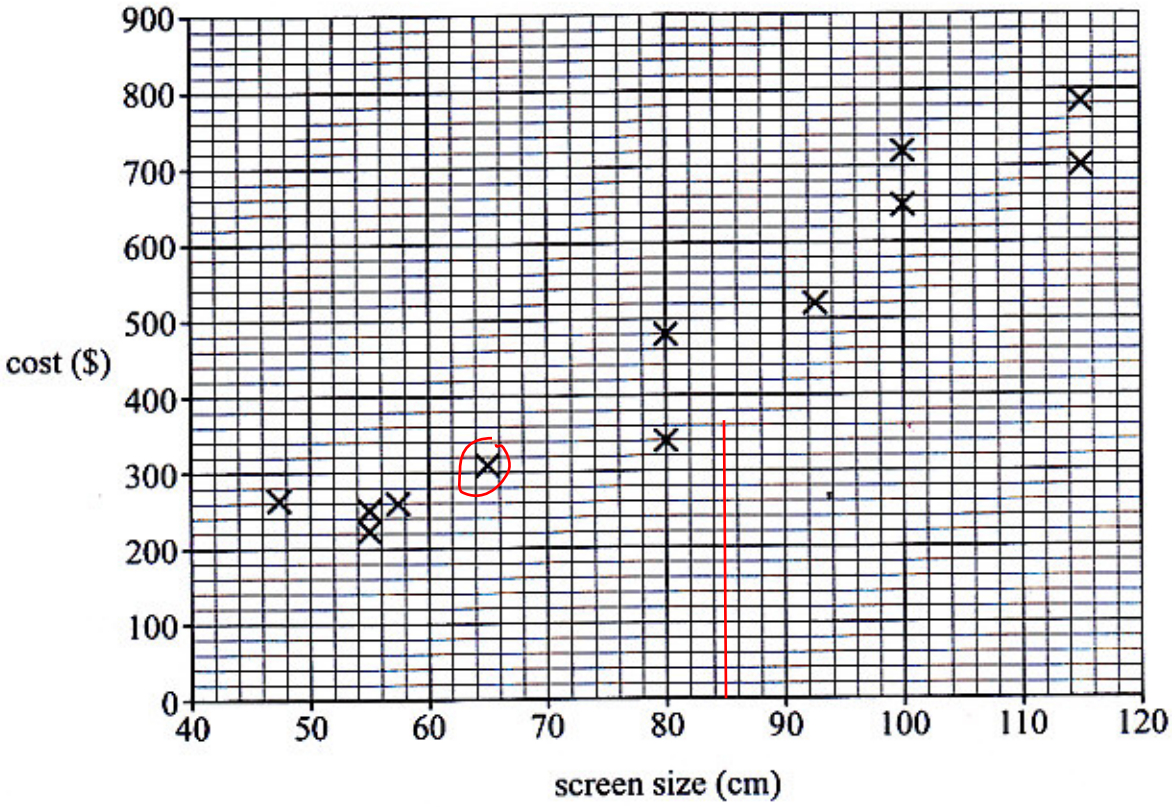
[1]

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

Write this distance correct to 3 significant figures.

92900000 ..... 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

$x =$ 7.1 [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.

↳ 2000 kg

Give your answer to the nearest year.

105 105+95 --- --- --- --- --- --- --- --- 2000

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

20 years [3]

23 A circular fish pond has an area of $20\,m^2$

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

$A = \pi r^2$

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

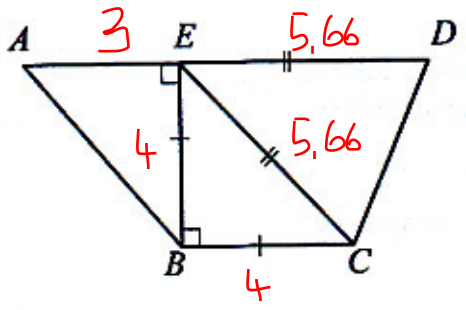
$r = \sqrt{\dfrac{A}{\pi}}$

$= \sqrt{\dfrac{20}{3.14}} = 2.5$ 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*.

$EC = \sqrt{4^2 + 4^2}$

$= \sqrt{16 + 16}$

$= \sqrt{32}$

$= 5.66$ cm

$AD = AE + ED$

$= 3 + 5.66$

$= 8.66$

8.66 cm [3]