UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

MATHEMATICS **0580/23**

Paper 2 (Extended) **May/June 2011**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Mathematical tables (optional)
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 π, 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.

This document consists of **12** printed pages.

1 Factorise completely.

$$2xy - 4yz$$

Answer ..... [2]

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2 Make x the subject of the formula. $y = \frac{x}{3} + 5$

Answer $x =$ ..... [2]

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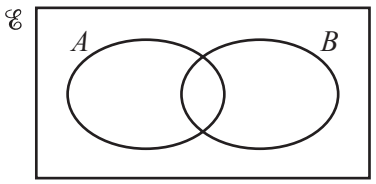
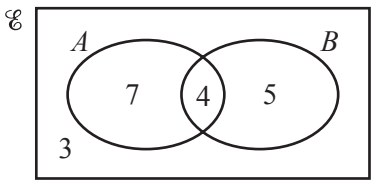
3 **(a)**



Shade the region $A \cap B'$. [1]

(b)



This Venn diagram shows the number of elements in each region.

Write down the value of n $(A \cup B')$.

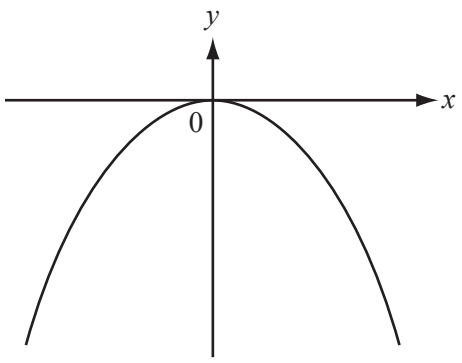
Answer(b) n $(A \cup B')$ = ... [1]

For Examiner's Use

4 Helen measures a rectangular sheet of paper as 197 mm by 210 mm, each correct to the nearest millimetre.
Calculate the upper bound for the perimeter of the sheet of paper.

Answer ..... mm [2]

5



NOT TO SCALE

The sketch shows the graph of $y = ax^n$ where a and n are integers.

Write down a possible value for a and a possible value for n.

Answer a = ...

n = ... [2]

---

6 **(a)** Write 16 460 000 in standard form.

Answer(a) ..... [1]

(b) Calculate $7.85 \div (2.366 \times 10^2)$, giving your answer in standard form.

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

For Examiner's Use

7 **(a)** Find the value of x when $\frac{18}{24} = \frac{27}{x}$.

Answer(a) $x =$ ..... [1]

(b) Show that $\frac{2}{3} \div 1\frac{1}{6} = \frac{4}{7}$.
Write down all the steps in your working.

Answer(b)

[2]

---

8 Solve the simultaneous equations.

$$x + 2y = 3$$
$$2x - 3y = 13$$

Answer $x =$ .....

$y =$ ..... [3]

---

9 Eva invests \$120 at a rate of 3% per year **compound interest**.

Calculate the total amount Eva has after 2 years.
Give your answer correct to 2 decimal places.

Answer \$ ..... [3]

For Examiner's Use

10 The cost of a cup of tea is t cents.

The cost of a cup of coffee is $(t + 5)$ cents.

The total cost of 7 cups of tea and 11 cups of coffee is 2215 cents.

Find the cost of one cup of tea.

Answer ..... cents [3]

---

11 The volume of a solid varies directly as the **cube** of its length.
When the length is 3 cm, the volume is 108 cm^3.

Find the volume when the length is 5 cm.

Answer ..... cm^3 [3]

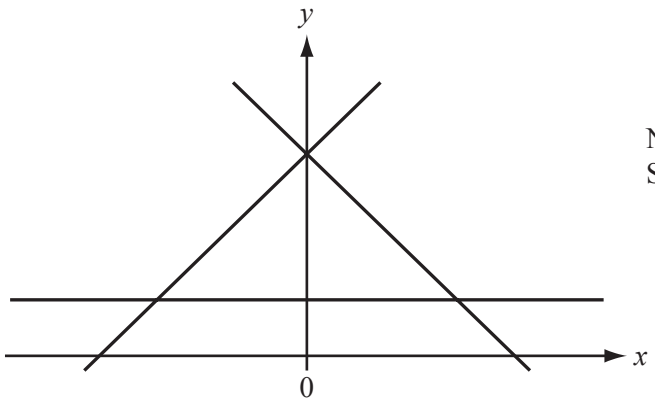
---

12 Federico changed 400 euros (€) into New Zealand dollars (NZ$) at a rate of €1 = NZ$ 2.1 .
He spent x New Zealand dollars and changed the rest back into euros at a rate of €1 = NZ$ d.

Find an expression, in terms of x and d, for the number of euros Federico received.

Answer € ..... [3]

13

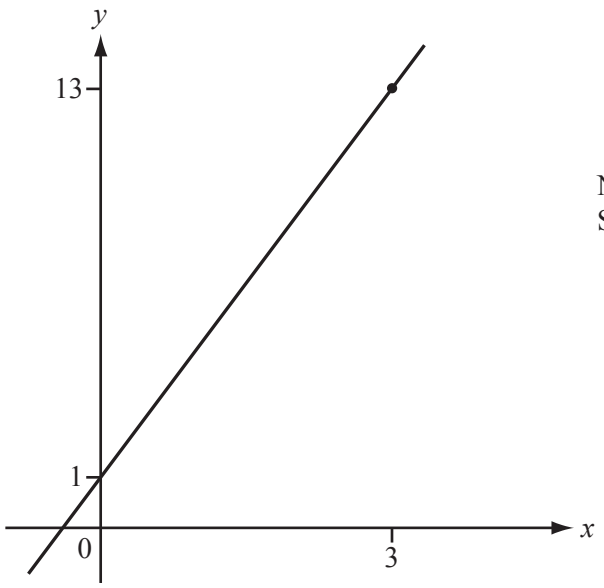


NOT TO SCALE

The diagram shows the lines $y = 1$, $y = x + 4$ and $y = 4 - x$.

On the diagram, **label the region R** where $y \geqslant 1$, $y \geqslant x + 4$ and $y \leqslant 4 - x$. [3]

14



NOT TO SCALE

The diagram shows the straight line which passes through the points (0, 1) and (3, 13).

Find the equation of the straight line.

Answer ..... [3]

---

15 A cylinder has a height of 12 cm and a volume of 920 cm^3.

Calculate the radius of the base of the cylinder.

Answer ..... cm [3]

For Examiner's Use

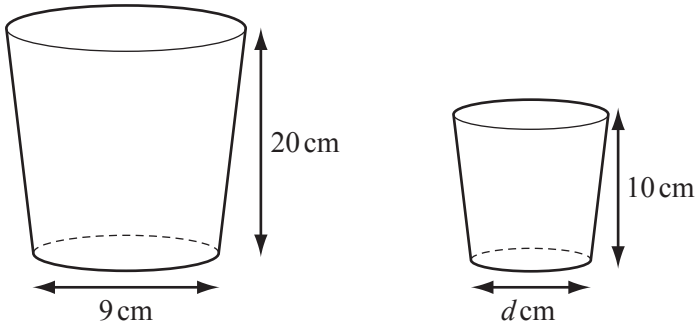
For Examiner's Use

16 Write $\frac{2}{x-2}+\frac{3}{x+2}$ as a single fraction.

Give your answer in its simplest form.

Answer ..... [3]

17



NOT TO SCALE

The diagrams show two mathematically similar containers.
The larger container has a base with diameter 9 cm and a height 20 cm.
The smaller container has a base with diameter d cm and a height 10 cm.

(a) Find the value of d.

Answer(a) d = ... [1]

(b) The larger container has a capacity of 1600 ml.

Calculate the capacity of the smaller container.

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

For Examiner's Use

18 Simplify the following.

(a) $(3x^3)^3$

Answer(a) ..... [2]

(b) $(125x^6)^{\frac{2}{3}}$

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

---

19 The scale of a map is 1 : 250 000.

(a) The actual distance between two cities is 80 km.

Calculate this distance on the map. Give your answer in centimetres.

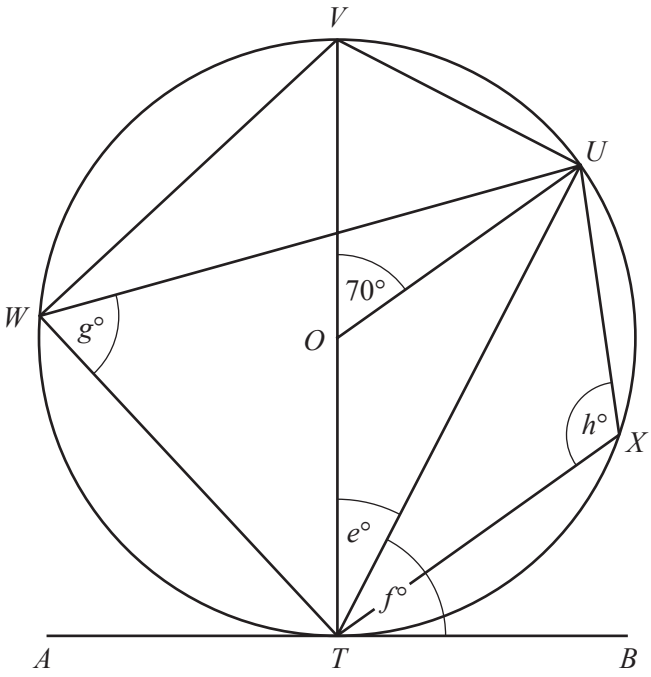
Answer(a) ..... cm [2]

(b) On the map a large forest has an area of 6 cm^2.

Calculate the actual area of the forest. Give your answer in square kilometres.

Answer(b) ..... km^2 [2]

20



NOT TO SCALE

The diagram shows a circle, centre O.
VT is a diameter and ATB is a tangent to the circle at T.
U, V, W and X lie on the circle and angle $VOU = 70°$.

Calculate the value of

(a) e,

Answer(a) $e =$ ..... [1]

(b) f,

Answer(b) $f =$ ..... [1]

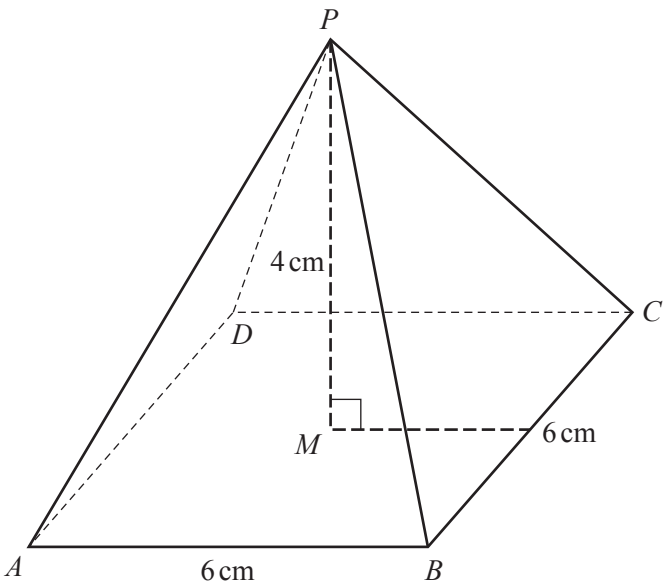
(c) g,

Answer(c) $g =$ ..... [1]

(d) h.

Answer(d) $h =$ ..... [1]

21



The diagram shows a pyramid with a square base $ABCD$ of side 6 cm.

The height of the pyramid, PM, is 4 cm, where M is the centre of the base.

Calculate the total surface area of the pyramid.

Answer ..... cm^2 [5]

Question 22 is printed on the next page.

22

A train journey takes one hour.
The diagram shows the speed-time graph for this journey.

(a) Calculate the total distance of the journey.

Give your answer in kilometres.

Answer(a) ..... km [3]

(b) **(i)** Convert 3 kilometres / minute into metres / second.

Answer(b)(i) ..... m/s [2]

(ii) Calculate the acceleration of the train during the first 4 minutes.

Give your answer in metres / second^2.

Answer(b)(ii) ..... m/s^2 [2]

For Examiner's Use