Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

0192305393

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2015**

1 hour 45 minutes

Candidates answer on the Question Paper.

Additional Materials: Geometrical Instruments
Graphics Calculator

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.
Do not use staples, paper clips, glue or correction fluid.
You may use an HB pencil for any diagrams or graphs.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all the relevant working to gain full marks and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
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 96.

This document consists of **16** printed pages.

CAMBRIDGE International Examinations

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

Answer **all** the questions.

1 **(a)** Write down three hundred thousand and fifty eight as a number.

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

(b) Work out.

$42 - 8 \times 6$

Answer(b) ..... [1]

(c) Write 21 648 correct to the nearest hundred.

Answer(c) ..... [1]

(d) Write 0.05625 correct to 2 decimal places.

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

(e) Find $\frac{3}{7}$ of 182.

Answer(e) ..... [1]

(f) The average temperature in Amsterdam in February is −2°C.
In July the average temperature is 21°C.

Find the difference between these two temperatures.

Answer(f) .....°C [1]

(g) Write 65% as a fraction in its lowest terms.

Answer(g) ..... [2]

(h) Divide 133 in the ratio 4 : 3.

Answer(h) ..... : ..... [2]

2 **(a)** Simplify.

$6x - 3y + 2x + y$

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

(b) Find the value of $2a + b + 3c$ when $a = 3, b = -2$ and $c = 4$.

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

(c) $L = 2x + 3y$

Find the value of x when $L = 18.6$ and $y = 2.8$.

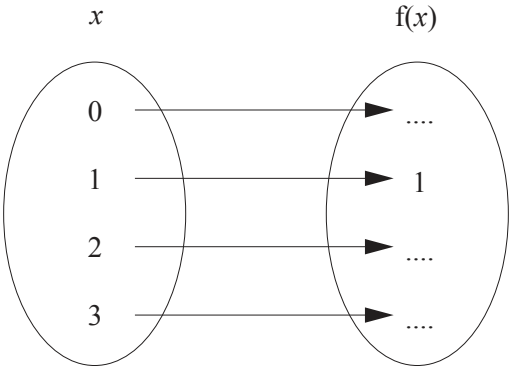
Answer(c) $x =$ ..... [2]

(d) Solve the equation.

$5x - 3 = 7$

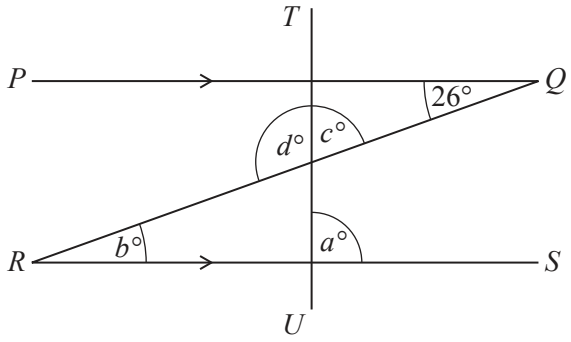
Answer(d) $x =$ ..... [2]

(e) Complete the mapping diagram for $f : x \rightarrow 2x - 1$.



[2]

3



NOT TO SCALE

PQ and *RS* are parallel lines.
QR is a straight line and *TU* is a straight line perpendicular to *PQ* and *RS*.
Angle *PQR* = 26°.

Find the values of *a*, *b*, *c* and *d*.

Answer a = ...

b = ...

c = ...

d = ... [4]

---

4 Thirty students and three teachers go by bus on a school trip to the zoo.

(a) The entrance fee is \$10 for each student and \$15 for each teacher.

Find the **total** cost of the entrance fees.

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

(b) The bus costs \$600 to hire.
Lunch costs \$5 for each person.

Find the **total** cost of the trip including the entrance fees.

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

(c) The total cost of the trip is divided between the 30 students.

Calculate the cost of the trip for each student.

Answer(c) \$ ..... [2]

5 A list of numbers is shown below.

5 8 6 2 8 4 5 8

(a) For the list of numbers, find

(i) the mode,

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

(ii) the median,

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

(iii) the lower quartile,

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

(iv) the range,

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

(v) the mean.

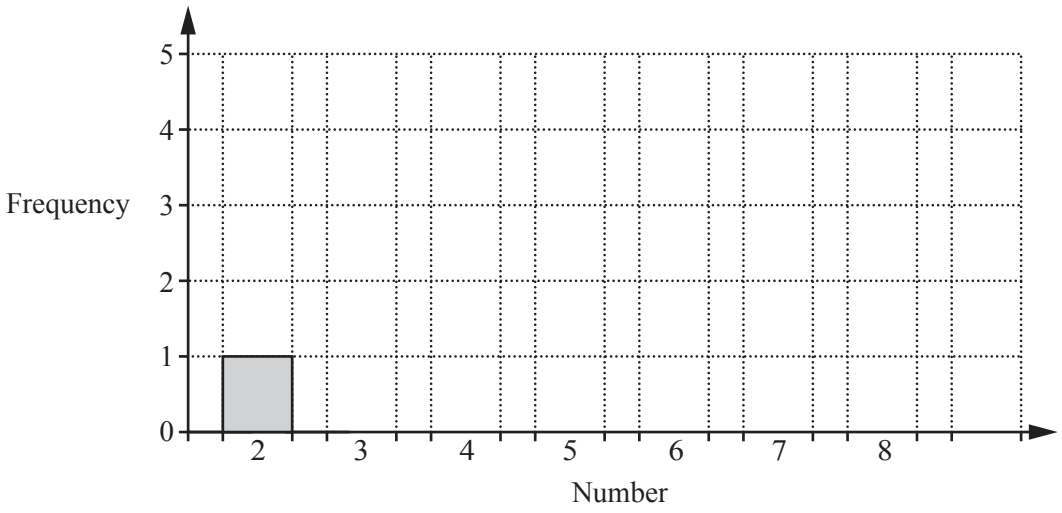
Answer(a)(v) ..... [1]

(b) (i) Using the list of numbers, complete the frequency table.

Number	Frequency
2	
3	
4	
5	
6	
7	
8	

[1]

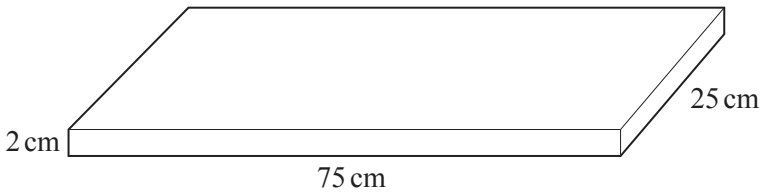
(ii) Complete the bar chart.
One bar has been drawn for you.



[2]

6

NOT TO SCALE



The diagram shows a bookshelf.
It is made from a piece of wood 75 cm long, 25 cm wide and 2 cm thick.

(a) Find the volume of this piece of wood.

Answer(a) ..... cm^3 [2]

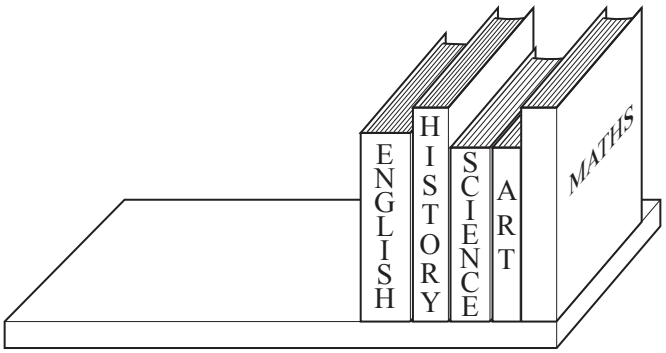
(b) **(i)** Find the total surface area of this piece of wood.

Answer(b)(i) ..... cm^2 [3]

(ii) Write your answer to **part (b)(i)** in square metres.

Answer(b)(ii) ..... m^2 [1]

(c)



NOT TO SCALE

Jessie wants to stand 18 books on the bookshelf.

- 5 books are each 3 cm wide
- 6 books are each 4 cm wide
- 4 books are each 2.5 cm wide
- 3 books are each 7 cm wide

Can Jessie stand all these books on the bookshelf?
Show all your working.

[2]

7

23, 16, 9, 2, …

(a) Find the next two terms in this sequence.

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

(b) Find an expression for the nth term of this sequence.

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

---

8 The equation of line L is $2y = 3 - x$.

(a) Find the gradient of line L.

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

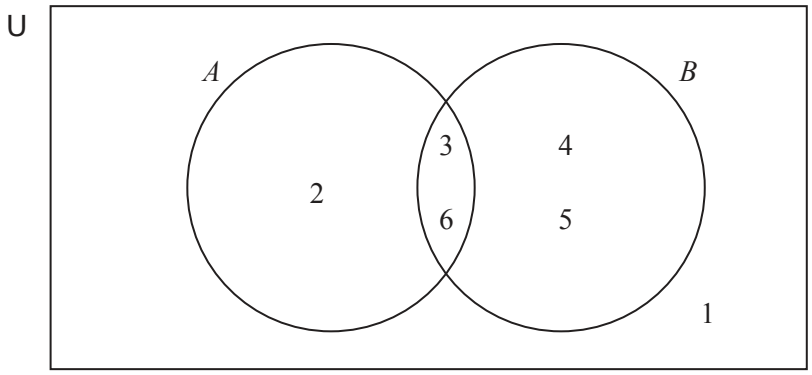
(b) Write down the gradient of a line parallel to L.

Answer(b) ..... [1]

(c) Find the equation of the line parallel to L that passes through the point (0, 6).

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

9



List the elements in each of the following sets.

(a) (i) A

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

(ii) $A \cap B$

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

(iii) $A \cup B$

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

(iv) B'

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

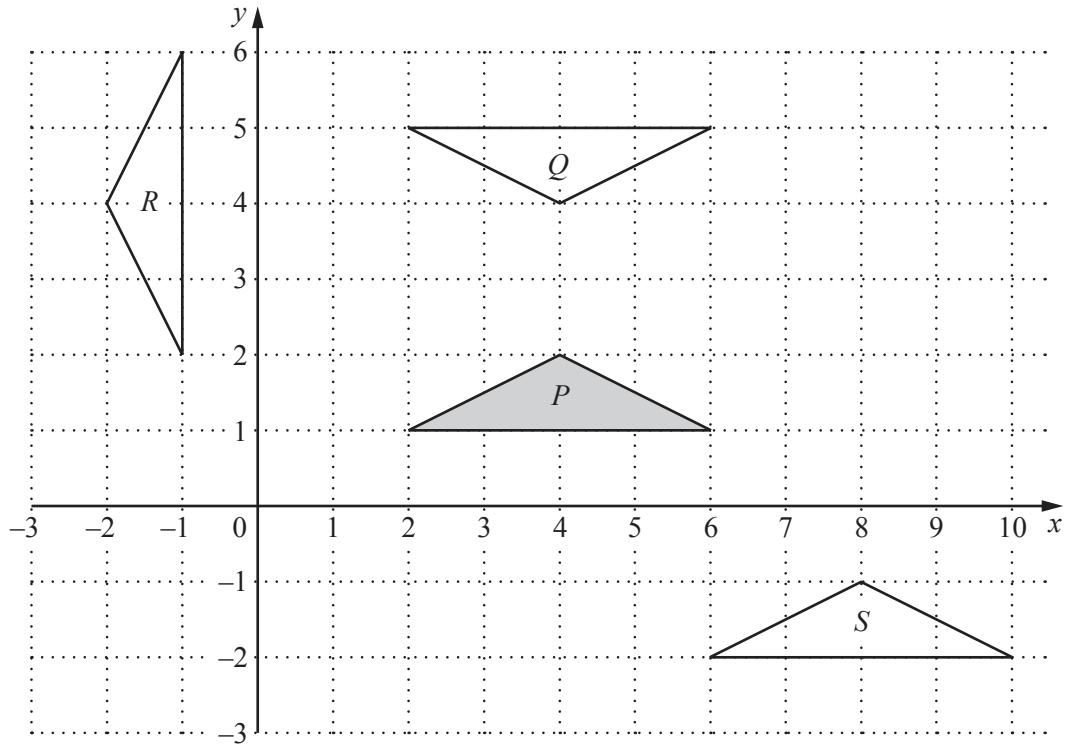
(v) $A' \cap B$

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

(b) Find n(U).

Answer(b) ..... [1]

10



(a) Triangle Q is a reflection of triangle P.

On the grid, draw the line of reflection.
Write down the equation of this line.

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

(b) Triangle S is a translation of triangle P.

Find the vector for this translation.

Answer(b) $\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

(c) Triangle R is a rotation of triangle P.

Find the centre and the angle of rotation.

Answer(c) Centre = ... (..... , ...)

Angle = ...
[2]

11 **(a)** Campbell can text at an average speed of 100 characters per minute.

Find how long it takes her to text a message of 320 characters.
Give your answer in minutes and seconds.

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

(b) Diago texts a message of 168 characters in 1 minute 36 seconds.

Find the average speed at which he texts.
Give your answer in characters per minute.

Answer(b) ..... characters per minute [3]

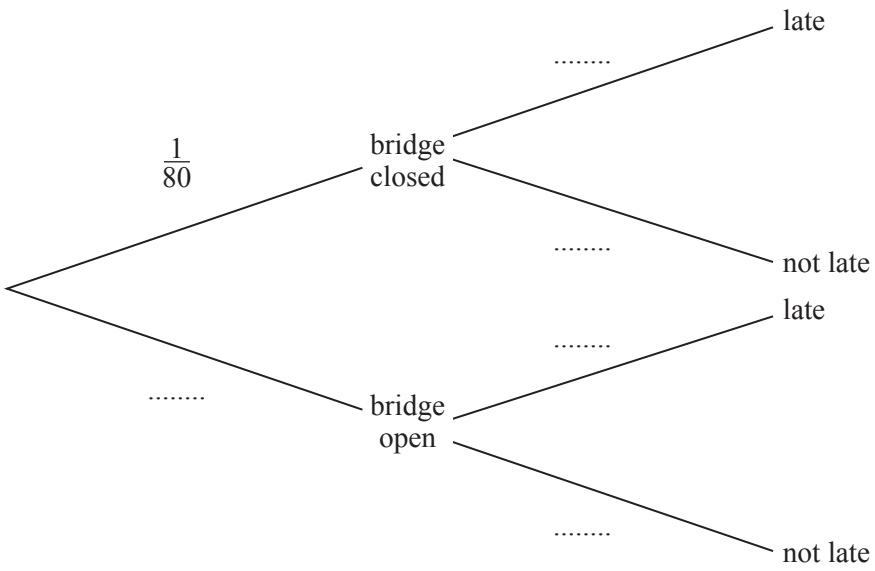
12 On the way to work Herr Smit drives over a bridge.

The probability that the bridge is closed is $\frac{1}{80}$.

If the bridge is closed then the probability that Herr Smit is late for work is $\frac{2}{3}$.

If the bridge is open then the probability that he is late for work is $\frac{1}{50}$.

(a) Complete the tree diagram.



[3]

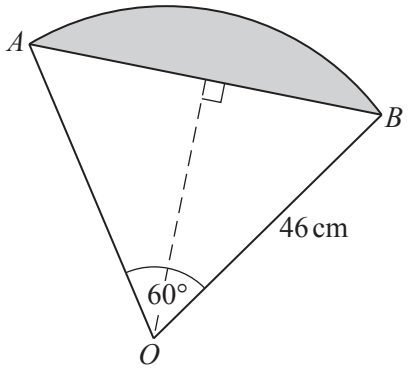
(b) Find the probability that the bridge is closed and Herr Smit is not late for work.

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

(c) In 2014, Herr Smit worked for 250 days.
Estimate the number of days that the bridge was closed and Herr Smit was not late for work.

Answer(c) ..... [2]

13



NOT TO SCALE

The diagram shows a sector of a circle, centre O, radius 46 cm.
Angle $AOB = 60°$.

(a) Explain why $AB = 46$ cm.

[2]

(b) Calculate the length of arc AB.

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

(c) Calculate the area of sector AOB.

Answer(c) .....cm^2 [2]

(d) Find the area of triangle AOB.

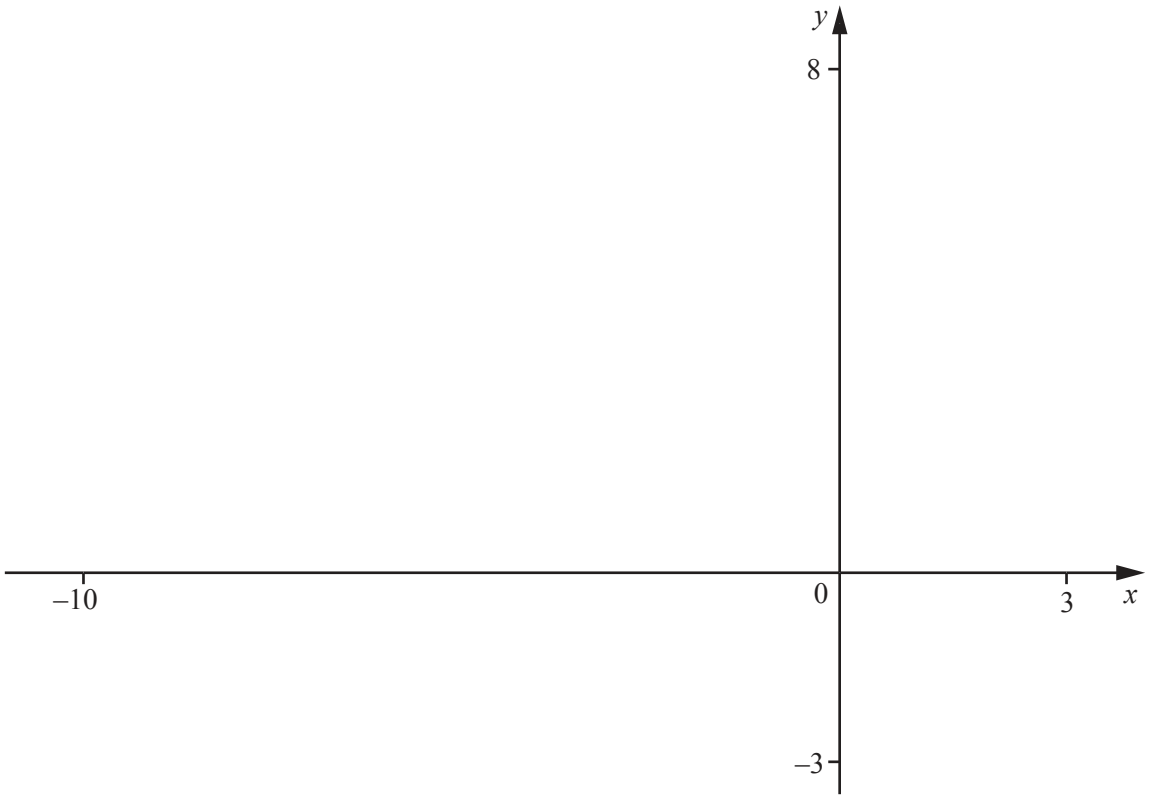
Answer(d) ..... cm^2 [3]

(e) Use your answers to **part (c)** and **part (d)** to find the area of the shaded segment.

Answer(e) ..... cm^2 [1]

Question 14 is printed on the next page

14



$f(x) = 3 \times 2^{(0.5x)} - 1$

(a) On the diagram, sketch the graph of $y = f(x)$ for $-10 \leqslant x \leqslant 3$. [2]

(b) Write down the x co-ordinate of the point where the curve crosses the x-axis.

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

(c) Write down the equation of the horizontal asymptote.

Answer(c) ..... [1]

(d) On the same diagram, sketch the graph of $y = -2x + 3$. [2]

(e) Find the co-ordinates of the point where the two graphs intersect.

Answer(e) (..... , ...) [2]