Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

7511236721

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/42**

Paper 4 (Extended) **October/November 2015**

2 hours 15 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.
Answer 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 120.

DC (LEG/SW) 100760/1
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Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area, A, of cylinder of radius r, height h. $\quad A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $\quad A = \pi rl$

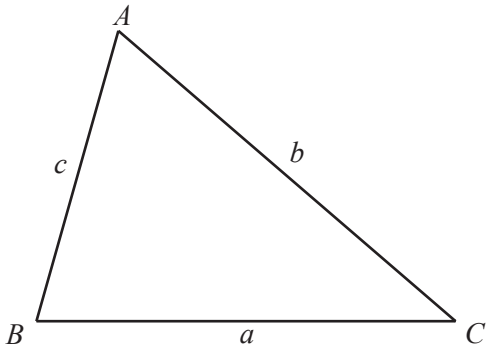
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

Volume, V, of pyramid, base area A, height h. $\quad V = \frac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\quad V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\quad V = \frac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\quad V = \frac{4}{3}\pi r^3$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1 **(a)** By writing each number correct to 1 significant figure, find an estimate for

$$\frac{\sqrt[3]{987}}{5.13} + \frac{(16.3 + 1.91^2)}{\sqrt{9.12}}.$$

You must show your working.

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

(b) Explain why your answer to **part (a)** is greater than the actual answer.

Answer(*b*) .....

..... [2]

(c) Work out.

$$\frac{\sqrt[3]{987}}{5.13} + \frac{(16.3 + 1.91^2)}{\sqrt{9.12}}.$$

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

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2 **(a)** Solve the equations.

(i) $4\log 3 - 3\log 4 = \log x - 5\log 2$

Answer(*a*)(i) $x =$ ..... [3]

(ii) $4\sin x + 3 = 1$ for $0^\circ \leqslant x \leqslant 360^\circ$

Answer(*a*)(ii) ..... [3]

(b) Make x the subject of the formula.

$$a = \sqrt{\frac{x-1}{x}}$$

Answer(*b*) $x =$ ..... [3]

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3 The table gives the marks of 10 students in a geography exam and a history exam.

Geography mark (x)	12	23	36	41	57	62	78	81	89	93
History mark (y)	32	43	41	51	52	60	68	65	76	80

(a) Find

(i) the mean geography mark,

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

(ii) the mean history mark.

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

(b) **(i)** Find the equation of the regression line for y in terms of x.

Answer(*b*)(i) $y =$ ..... [2]

(ii) Estimate the history mark when the geography mark is 51.

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

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4 The transformation P is a reflection in the x-axis.
The transformation Q is a rotation of 90° clockwise about the origin.

(a) Write down the transformation that is

(i) the inverse of P,

Answer(a)(i) .....

..... [1]

(ii) the inverse of Q.

Answer(a)(ii) .....

..... [2]

(b) Describe fully the **single** transformation equivalent to P followed by Q.

Answer(*b*) .....

..... [2]

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5 Find the next term and the nth term in each of the following sequences.

(a) 27, 20, 13, 6, – 1, ...

Answer(a) next term = ...

nth term = ... [3]

(b) 1024, 512, 256, 128, 64, ...

Answer(b) next term = ...

nth term = ... [3]

6 The marks, x, of 800 students in a mathematics exam are given in the table.

Mark (x)	Frequency
$0 < x \leqslant 20$	62
$20 < x \leqslant 30$	84
$30 < x \leqslant 40$	140
$40 < x \leqslant 50$	160
$50 < x \leqslant 60$	142
$60 < x \leqslant 80$	112
$80 < x \leqslant 100$	100

(a) Calculate an estimate of the mean mark.

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

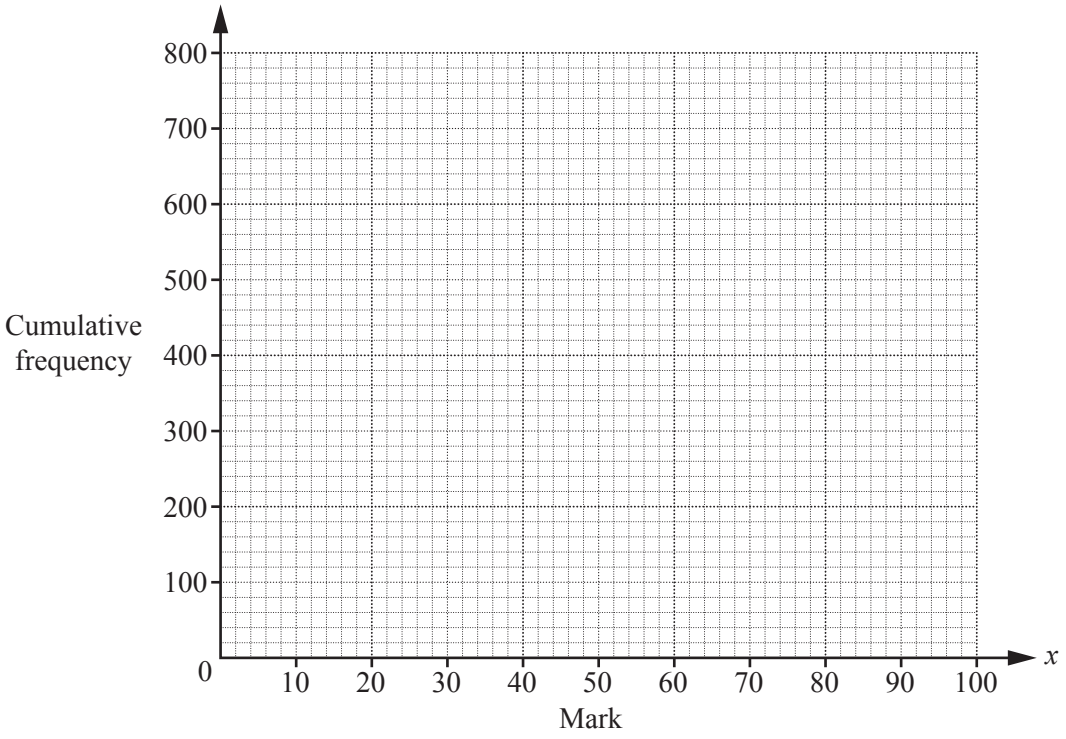
(b) Complete the cumulative frequency table.

Mark (x)	Cumulative frequency
$0 < x \leqslant 20$	62
$0 < x \leqslant 30$	
$0 < x \leqslant 40$	
$0 < x \leqslant 50$	
$0 < x \leqslant 60$	
$0 < x \leqslant 80$	
$0 < x \leqslant 100$	800

[1]

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(c) On the grid below, draw a cumulative frequency curve.



[3]

(d) Use your graph in **part (c)** to find estimates for

(i) the median mark,

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

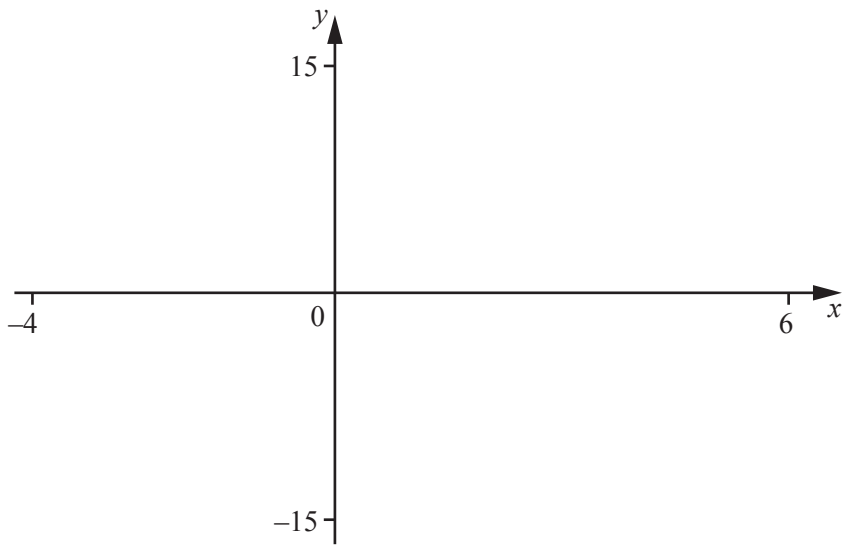
(ii) the interquartile range,

Answer(d)(ii) ..... [2]

(iii) the minimum mark for a candidate to obtain a grade A, given that 15% of students gain a grade A.

Answer(d)(iii) ..... [3]

7



$$f(x) = \frac{(6x + 11)}{(2x - 3)}$$

(a) **(i)** On the diagram, sketch the graph of $y = f(x)$, for values of x between $x = -4$ and $x = 6$. [2]

(ii) Write down the equations of the asymptotes.

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

(iii) Write down the co-ordinates of the points where the graph crosses the axes.

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

(b) Solve the inequality.

$$x < \frac{(6x + 11)}{(2x - 3)}$$

Answer(b)..... [4]

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8 Freddo lives in Manchester. He drives to Cambridge for a meeting.
The distance from Manchester to Cambridge is 300 km.

(a) Freddo leaves Manchester at 07 05 and arrives in Cambridge at 10 50.

Calculate his average speed.

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

(b) After the meeting Freddo drives back to Manchester.
His average speed for this journey is 5% more than his average speed driving to Cambridge.
He leaves Cambridge at 17 45.

Find the time Freddo arrives in Manchester.

Answer(b) ..... [3]

(c) Freddo's car uses fuel at the rate of 8.1 km per litre.
Fuel costs £1.45 per litre.

Find the total cost of fuel for Freddo's journey from Manchester to Cambridge and back to Manchester.

Answer(c) £ ..... [2]

9 **(a)** A coat costs \$100.
The price is increased by 10% and then decreased by 10%.

Find the new price of the coat.

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

(b) A chair costs \$1000.
The price is increased by 20% and then decreased by 20%.

Find the new price of the chair.

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

(c) A car costs \$10 000.

The price is increased by x% and then decreased by x%.

Find an expression, in terms of x, for the new price of the car.
Give your answer in its simplest form.

Answer(c) \$ ..... [3]

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10 A bag contains 3 red balls and 5 blue balls.
In an experiment, three balls are chosen at random without replacement.

(a) Find the probability that the three balls chosen are

(i) all red,

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

(ii) two red and one blue,

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

(iii) at least one of each colour.

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

(b) This experiment is to be carried out 1680 times.

Find the expected frequency of 3 red balls being chosen.

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

11 A is the point (2, 6) and C is the point (5, 4).

The equation of the line AB is $y + 4x = 14$.
The equation of the line BC is $y = x - 1$.

(a) B is the point where the lines AB and BC intersect.

Find the co-ordinates of the point B.

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

(b) M is the midpoint of AC.

Find the co-ordinates of M.

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

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(c) Find the equation of the line BM.

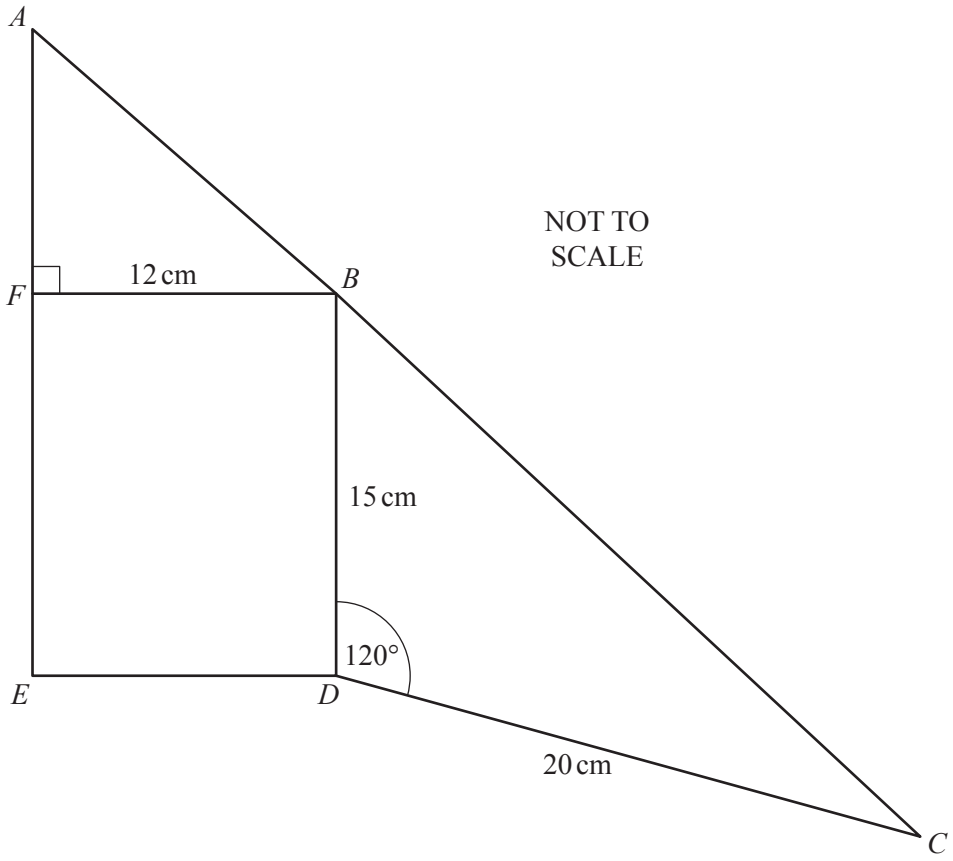
Answer(c) ..... [3]

(d) The point D lies on the line BM.
The co-ordinates of D are $(k, k + 9)$.

Find the value of k.

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

12 In the diagram, *ABC* is a straight line and *BFED* is a rectangle.



(a) Find *BC*.

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

(b) Show that angle *DBC* = 34.7°, correct to 3 significant figures.

[3]

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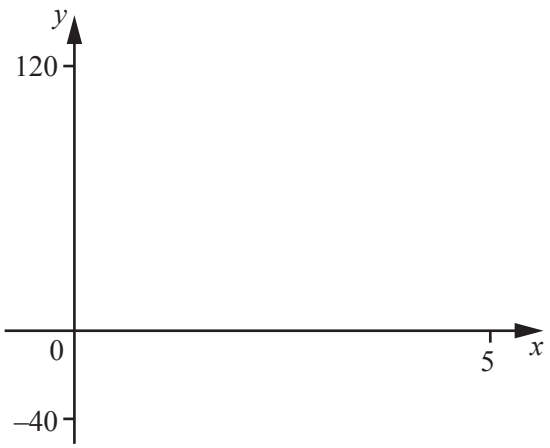
(c) Find the perimeter of the quadrilateral *ACDE*.

Answer(c) ..... cm [4]

(d) Find the area of the quadrilateral *ACDE*.

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

13



$$f(x) = \frac{100}{2^x} - 10$$

(a) **(i)** On the diagram, sketch the graph of $y = f(x)$, for $0 \leqslant x \leqslant 5$. [2]

(ii) Write down the x co-ordinate of the point where the graph crosses the x-axis.

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

(iii) Write down the range of $f(x)$.

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

(b) Solve the equation.

$$\frac{100}{2^x} - 10 = 20$$

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

(c) Describe fully the **single** transformation that maps the graph of $y = \frac{100}{2^x}$ onto the graph of $y = \frac{100}{2^x} - 10$.

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

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14 A fraction P has denominator x.
The numerator of the fraction is 3 less than the denominator.

(a) Write down fraction P in terms of x.

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

(b) The numerator and the denominator of fraction P are each increased by 3 to give fraction Q.

Write down fraction Q in terms of x.

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

(c) $Q - P = \frac{9}{40}$

(i) Write down an equation in x and show that it simplifies to $x^2 + 3x - 40 = 0$.

[3]

(ii) Solve the equation $x^2 + 3x - 40 = 0$.

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

(iii) Write down the original fraction, P.

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

Question 15 is printed on the next page.

15 Solve the inequalities.

(a) $\frac{5}{2x-1} < 3$

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

(b) $\log(2^x) > 10$

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

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