

**MARK SCHEME for the October/November 2011 question paper  
for the guidance of teachers**

**0607 CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/06**

Paper 6 (Extended), maximum raw mark 40

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

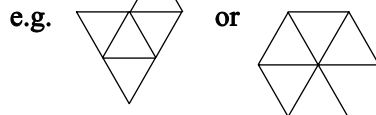
Cambridge is publishing the mark schemes for the October/November 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

**A INVESTIGATION MAXIMISING THE PERIMETER**

1 (a) 4 joined equilateral triangles (not in row)



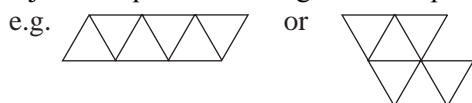
5 joined equilateral triangles (not in row)



Shapes may not be rotations or reflections of those given

1 1 for both a 4 triangle and a 5 triangle diagram

(b) (i) 6 joined equilateral triangles with a perimeter > 6



1

(ii) 7 joined equilateral triangles with a perimeter > 7



1

(c) (i)

Number of equilateral triangles	2	3	4	5	6	7	8
Greatest perimeter (cm)	4	5	6	7	8	9	10

1 -1 any error or omission  
C C opportunity

(ii) 22 (cm)

1

(iii) 30 (triangles)

1

(d)  $x + 2$  oe

1 Not  $x = y = -1$  mark once only

2 (a) 14 (cm)

1 C opportunity

(b) (i)

Number of squares	2	3	4	5	6	7	8	9	10
Greatest perimeter (cm)	6	8	10	12	14	16	18	20	22

1 -1 any error or omission

(ii) 36 (cm)

1

(iii) 15 (squares)

1

(c)  $2x + 2$  oe

1

<b>3</b>	<b>(a)</b>													
	<table border="1"> <tr> <td>Number of regular hexagons</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>Greatest perimeter (cm)</td> <td><b>10</b></td> <td><b>14</b></td> <td><b>18</b></td> <td><b>22</b></td> <td>26</td> </tr> </table>	Number of regular hexagons	2	3	4	5	6	Greatest perimeter (cm)	<b>10</b>	<b>14</b>	<b>18</b>	<b>22</b>	26	<b>1</b> <b>C</b>
Number of regular hexagons	2	3	4	5	6									
Greatest perimeter (cm)	<b>10</b>	<b>14</b>	<b>18</b>	<b>22</b>	26									
	<b>(b)</b> $4x + 2$ oe	<b>1</b>												
<b>4</b>	$6x + 2$ oe	<b>1</b>												
<b>5</b>	<b>(a)</b> $(y - 2)x + 2$ oe	<b>2</b>	<b>1</b> for $y - 2$ seen											
	<b>(b)</b> $x = 24, y = 3$ $x = 12, y = 4$ $x = 8, y = 5$ $x = 6, y = 6$ $x = 4, y = 8$ $x = 3, y = 10$ $x = 2, y = 14$ $x = 1, y = 26$	<b>2FT</b> <b>C</b>	fit their part <b>(a)</b> <b>1</b> for one or two correct pairs C opportunity											
		<b>C1</b>	<b>1</b> for two C opportunities seen											
			<b>[Total: 20]</b>											

B	MODELLING COVERING CAKES		
1	<p>(a) Volume = <math>x \times x \times y</math> oe e.g. <math>V = x^2y</math>  <math>y = \frac{4000}{x^2}</math></p> <p>(b) <math>S = x^2 + 4xy</math> oe  <math>S = x^2 + \frac{4x(4000)}{x^2}</math>  <math>S = x^2 + \frac{16000}{x}</math></p> <p>(c) correct sketch</p> <p>(d) (minimum surface area =) 1200 (cm<sup>2</sup>)   <math>(x =) 20</math>  <math>(y =) 10</math></p>	<p>1</p> <p>C</p> <p>1</p> <p>1</p> <p>1 C</p> <p>1</p> <p>1</p> <p>1</p>	<p>C opportunity</p> <p>C opportunity</p>
2	<p>(a) <math>V = \pi x^2 y (= 4000)</math>  <math>S = \pi x^2 + 2\pi xy</math>  <math>y = \frac{4000}{\pi x^2}</math> or <math>\pi xy = \frac{4000}{x}</math> oe  <math>S = \pi x^2 + 2\pi x \frac{4000}{\pi x^2}</math>  <math>S = \pi x^2 + \frac{8000}{x}</math></p> <p>(b) correct sketch</p> <p>(c) (minimum surface area =) 1110 (cm<sup>2</sup>) or better (1107.162...)   <math>(x =) 11</math> or better (10.8385...)  <math>(y =) 11</math> or better (10.8385...)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>C</p> <p>1 C</p> <p>1</p> <p>1</p> <p>1</p>	<p>C opportunity</p> <p>C opportunity</p>
3	<p>(a) Multiply by thickness</p> <p>(b) Not uniform thickness or  Missing elements of volume }</p>	<p>1</p> <p>1</p>	<p>explanation</p> <p>comment</p>

<b>Page 5</b>	<b>Mark Scheme: Teachers' version</b>	<b>Syllabus</b>
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4	<p>Square based:  <math>\text{top} = 400 \text{ cm}^2</math> : <math>\text{sides} = 800 \text{ cm}^2</math></p> <p>Circular based:  <math>\text{Top} = 369(.05..) \text{ cm}^2</math> : <math>\text{sides} = 738(.1..) \text{ cm}^2</math></p> <p>Yes, both in ratio – <math>\text{top} : \text{sides} = 1 : 2</math></p>	<b>1</b>	for areas
		<b>1</b>	for areas
		<b>CFT</b>	<b>C</b> opportunity for statement that FT their areas
		<b>C1</b>	<b>1</b> for two opportunities seen
			<b>[Total 20]</b>