MARK SCHEME for the May/June 2009 question paper
for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS
0607/04 Paper 4 (Extended), maximum raw mark 120

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the examination. It shows the basis on which Examiners were instructed to award marks. It does not
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M marks are given for a correct method.
A marks are given for an accurate answer following a correct method.
B marks are given for a correct statement or step.
D marks are given for a clear and appropriately accurate drawing.
P marks are given for accurate plotting of points.
E marks are given for correctly explaining or establishing a given result.

Abbreviations

cao  correct answer only
cso  correct solution only
ft   follow through
oe   or equivalent
soi  seen or implied
ww   without working
www  without wrong working
1 (a) \[ \frac{200 (or 2200)}{20} = 10 \text{ (or 200)} \times 11 \quad \text{oe} \]

M1 M1

Implied by 10

Independent

(b) 57.5(0)

B2

If B0, M1 for \( \frac{50 \times 5 \times 3}{100} \) oe

(Implied by 7.50)

(c) 67.49 as final answer

B3

If B0, M2 for \( 60 \left( 1 + \frac{4}{100} \right)^3 \) oe

M1 for \( \times 1.04 \) more than once oe

67.49… or 67.5 imply M2

[7]

2 (a) 37.2 (or 37.20 – 37.21)

B1

(b) 37

B1

(c) 36

B1

(d) 36

B1

(e) 2

B1

[5]

3 (a) \((x + 2y)(2 + p)\)

B2 B1 for \(2(x + 2y) + p(x + 2y)\) o.e.

(b)

Reasonable sketch of parabola (U shape)
cutting x-axis either side of y-axis – dep

\(-2.16, 1.16\)

M1 M1dep

A1, A1

If using formula, M1 for \( \sqrt{2^2 - 4(2)(-5)} \)

seen

and if form \( \frac{p + (or-)\sqrt{q}}{r} \) then M1 for

\( p = -2 \) and \( r = 2 \times 2 \)

\( \left( \frac{-2 \pm \sqrt{44}}{4} \right) \)

SC1 for \(-2.2, 1.2\) or

\(-2.158…, 1.158…\) with or without working

SC2 for \(-2.16, 1.16\) without working

(c) \( y = k\sqrt{w} \)

\( 4 = k\sqrt{9} \)

\((y) = 8\)

www3

M1 M1

If using \( \frac{y}{4} = \frac{\sqrt{36}}{\sqrt{9}} \)

M2

A1

\( k = \frac{4}{3} \) implies M2

[9]
4 (a)  

KL

| B1 |

(b)  

AB

C

| B2 | SC1 for any 4 of the 5 parts shaded |

(c)  

4

| B2 |

Do not allow any decimals in answers

5 (a) (i)  

Correct shape
Point of inflexion at origin

| B1 | B1dep |

(ii)  

Correct shape
Correct position relative to axes

| B1 | B1dep |

(b)  

0, 4 cao

| B1,B1 |

Do not allow any decimals in answers

(c)  

(3, −27) cao

| B1,B1 |

Do not allow any decimals in answers

(d)  

−2.33 (−2.325…), 4.41 (4.407 − 4.408)

| B1,B1 | SC1 for −2.3 and 4.4 |

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### Question 6

**Part (a)**

\[ 35 + \text{their}(\frac{1}{4} \times 4) \]

\[ = \frac{2 \frac{1}{2} + 1 \frac{1}{4}}{9.88} (9.882\ldots) \]

Denote this as \( M2 \)

\[ M1 \text{ for } 1\frac{1}{4} \times 4 \text{ or 7 seen} \]

Denote this as \( A1 \)

**Part (b)**

\[ (i) \ 10 \div 12.6 \times 60 \ oe \]

\[ = 47.6 (47.61 - 47.62) \]

Denote this as \( M1 \)

Denote this as \( A1 \)

\[ 10 \div 0.21, 0.7936 \times 60 \]

Allow 48 also

\[ (ii) \ 12.6 \div 1.05 \ oe \]

Denote this as \( M1 \)

Denote this as \( A1 \)

\[ 12 \]

\[ \text{www2} \]

\[ 7 \] **Part (a)**

\[ (i) \ + 1, \text{ then } \div 2 \text{ or } \frac{y + 1}{2} \text{ or } x = 2y - 1 \]

\[ \frac{x + 1}{2} \ oe \]

Denote this as \( M1 \)

Denote this as \( A1 \)

\[ \frac{y + 1}{2} \text{ scores } M1 \text{ only} \]

**Part (b)**

\[ (i) \ \sqrt[3]{x} \ oe \]

Denote this as \( B1 \)

\[ (ii) \ \text{Reasonable sketch to be close to } (-1,0), (0, 0.5) \text{ and } (1, 1) \text{ 2 mm accuracy} \]

\[ (iii) \ \text{Reflection } y = x \]

Denote this as \( B1 \)

Denote this as \( B1 \)

Denote this as \( B1 \)

\[ \text{ft only if their graph is a reflection correct or ft} \]

\[ [7] \]

\[ [8] \]
8 (a) (i) \[ \frac{3^2 + 5^2 - 7^2}{2 \cdot 3 \cdot 5} \]
\[ 120^\circ \]
M2
M1 for correct implicit equation \( 7^2 = \ldots \)
Any other method must be complete and scores M2
A1
Without any working SC2
If M0, but 60° after some working SC1
Radians answer 2.09 without working SC1
(ii) \[ 0.5 \times 3 \times 5 \sin(\text{their } 120) \]
\[ 6.5(0) \ (6.495 \ldots) \text{ ft} \]
M1
A1 ft
(For Hero’s formula \( s = 7.5 \))
B1
B1 ft their angle with relevant sides
(b) (i) \( (0)40 \)
B1
(ii) 280 cao
B2
M1 for 100 (or 220 – their (a)(i)) at \( P \) or 80 (or their (a)(i) – 40) at \( B \)

9 (a)
Reasonable sketch of cubic with two turning points seen in correct order
2 turning points in correct quadrants
B1

(b)
\[ -11.1 \text{ to } 4.24 \ (\sim 4.236\ldots) \] as final answer
B1
Penalty –1 for double or feathery lines
B1, B1
SC1 –11 to 4.2
or SC1 for both 3 sf (or more) numbers seen
## 10

Throughout the question ratios score zero. If using decimals, 2 s.f. correct answers – penalty of 1 once. Use of words e.g. 5 in 28 or 5 out of 28, correct answers – penalty of one once. For method marks only accept probabilities between 0 and 1

**(a)**

(i) \( \frac{14}{28} \text{ oe} \), \( \frac{5}{28} (0.179) \), \( \frac{9}{28} (0.321) \)  
**B1,B1,B1**

(ii), (iii) \( 0.5, 0.1785 – 0.1786, 0.3214… \)

**(b)**

(i) \( \frac{14}{28} \times \frac{14}{28} \text{ oe} \left( \frac{1}{\frac{4}{7}} \right) \text{ www 2} \)  
**M1**

**A1**

(ii) \( 2 \times \frac{14}{28} \times \frac{5}{28} \text{ oe} \)  
\( \frac{140}{784} \text{ oe} \left( \frac{5}{28} \right), (0.179) \)  
**M1**

**A1**

0.1785 – 0.1786

(iii) \( 1 - \frac{9}{28} \times \frac{9}{28} \text{ oe} \)  
\( \frac{703}{784} \text{ oe} (0.897) \text{ www 2} \)  
**M1**

**A1**

0.8966 – 0.8967

## 11

**(a)**

Similar  
**B1**

Allow enlargement oe

**(b)**

(i) \( \frac{QT}{2.5} = \frac{6}{3} \text{ oe} \)  
\( \frac{5}{\text{www2}} \)  
**M1**

**A1**

(ii) \( \left( \frac{6}{5} \right)^2 \text{ or } k^2 \text{ oe} \)  
\( 11.2 \text{ cao www2} \)  
**M1**

**A1**

\( k \) must be from (i)

(iii) \( \sin X = \frac{\sin 26.5}{3} \times 2.5 \)  
\( 21.8 (21.82 – 21.83) \text{ www3} \)  
**M2**

**M1** for any correct implicit form  
\( \text{e.g. } \frac{\sin X}{2.5} = \frac{\sin 26.5}{3} \text{ www2} \)  
**A1**

Radians 0.9546.. ww implies M2
### 12 (a) \[ \frac{30}{360} \times \pi \times 24 \] oe

\[ 6.28 \quad (6.28 - 6.284) \quad \text{www2} \]

**M1**

**A1**

Accept 2 \( \pi \)

### (b) \[ \frac{30}{360} \times \pi \times 12^2 \]

\[ 37.7 \quad (37.68 - 37.70..) \quad \text{www2} \]

**M1**

**A1**

Accept 12 \( \pi \)

### (c) their \( (b) \times 3 \)

\[ 113 \quad (113.0 - 113.1..) \quad \text{ft} \quad \text{www2} \]

**M1**

**A1**

Accept 36 \( \pi \)

### (d) their \( (b) \times 2 \)

\[ 2 \times 3 \times 12 \]

their \( (a) \times 3 \)

\[ 166 \quad (166.2 - 166.3) \quad \text{cao} \quad \text{www4} \]

**M1**

**M1**

**M1**

**A1**

Accept 30 \( \pi + 72 \)

### 13 (a) 10 correct points

**B3**

**B2** for 8 or 9 correct points, **B1** for 6 or 7 points

### (b) Positive

**B1**

Ignore any wording which does not spoil answer

Accept accurate description linking height to points

### (c) (i) 179.9, 53.2

**B1,B1**

Accept 180 for 179.9

### (d) (i) \( p = 0.386h - 16.2 \)

\[ (0.3855 - 0.3856) \quad (\text{–16.16}..) \]

**B2**

If seen in correct form **B1** for 0.386, **B1** for –16.2. (Allow 0.39)

**SC1** if in correct form and both terms correct to 2 sf

### (ii) Line through their \( (179.9, 53.2) \) seen to be plotted.

Would extend to \( p \)-axis within 3 squares of 45

**B1**

Must be ruled and be from at least 165 to 190

Gradient must be positive

**SC1** if accurate and not ruled

### (iii) 52 or 53 or 54

**B1**

Must be integer
### 14 (a)

- \( y = 2x \) through (0, 0) and (5, 10)
- \( x + y = 10 \) through (10, 0) and (0, 10)
- \( 2x + y = 10 \) through (5, 0) and (0, 10)

Each straight line ruled L1
Max 2 if not ruled L1
Allow 2 mm accuracy at points indicated L1

### 14 (b)

Correct region unshaded ft B1 ft

### 14 (c)

(i) 3.2 – 3.4 ft B1 ft

### 14 (d)

1, 9
2, 7 ft B1 ft

### 15 (a)

(i) 30 B1

(ii) \( \frac{360}{x} \) B1

(iii) \( \frac{360}{x + 8} \) B1

### 15 (b)

(i) \( \frac{360}{x} - \frac{360}{x + 8} = 16 \) oe M2

360(x + 8) – 360x = 16x(x + 8) oe M1

360x + 2880 – 360x = 16x² + 128x E1

16x² + 128x – 2880 = 0

x² + 8x – 180 = 0

SC1 for sign errors SC1

Dep on M2 or SC1, for correctly putting all three terms over common denominator or multiplying throughout by \( x \) and \( x + 8 \). Dependent on M2 M1.

At least one of these two lines oe before final conclusion without any errors or omissions. Condone the absence of \( = 0 \) only once.

(ii) \((x + 18)(x – 10)\) B2

If B0, SC1 for \((x ± p)(x ± q)\) with values of 10 and 18 for \( p \) and \( q \)

(iii) –18, 10 ft B1 ft

Correct or ft SC1

(iv) 10 B1 ft

Can ft a positive root