



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education



CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/06

Paper 6 (Extended)

For Examination from 2010

SPECIMEN MARK SCHEME

1 hour 30 minutes

MAXIMUM MARK: 40

This document consists of **5** printed pages and **1** blank page.



TYPES OF MARK

- **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 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.
- **C** marks are given for clear communication (Papers 5 and 6 only).
- **R** marks are given for appropriate reasoning (Papers 5 and 6 only).

ABBREVIATIONS

- ft Follow through
- oe Or equivalent
- soi Seen or implied
- www Without wrong working

A Investigation

1	(a)	$\frac{3}{24} + \frac{4}{24} = \frac{7}{24}$	AR1	(both accuracy & reasons required)	
	(b)	$\frac{2}{12} + \frac{3}{12} = \frac{5}{12}$	AR1		
2	(a)	$\frac{1}{3} + \frac{1}{6} = \frac{2}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$	R1	for three correct	
	(b)	$\frac{1}{3} = \frac{1}{4} + \frac{1}{12}$	B1		
	(c)	$\frac{1}{4} = \frac{1}{5} + \frac{1}{20}$	B2		
		$\frac{1}{5} = \frac{1}{6} + \frac{1}{30}$	B1		
		$\frac{1}{6} = \frac{1}{7} + \frac{1}{42}$ $= \frac{1}{8} + \frac{1}{56}$	B1		
(d)	$\frac{1}{99} = \frac{1}{100} + \frac{1}{9900}$	B1			
(e)	$\frac{1}{n} = \frac{1}{n+1} + \frac{1}{n(n+1)}$	B2	B1 for $\frac{1}{x} + \frac{1}{nx}$		
3	(a)	$\frac{2}{3} = 2 \times \frac{1}{3} = 2 \left(\frac{1}{4} + \frac{1}{12} \right) = \frac{2}{4} + \frac{2}{12} = \frac{1}{2} + \frac{1}{6}$	R2		
	(b)	(i)	$\frac{2}{5} = 2 \left(\frac{1}{6} + \frac{1}{30} \right) = \frac{1}{3} + \frac{1}{15}$		AR1
		(ii)	$\frac{2}{7} = 2 \left(\frac{1}{8} + \frac{1}{56} \right) = \frac{1}{4} + \frac{1}{28}$		AR1
	(c)	(i)	$\frac{3}{8} = 3 \left(\frac{1}{9} + \frac{1}{72} \right) = \frac{1}{3} + \frac{1}{24}$		AR1
(ii)		$\frac{4}{11} = 4 \left(\frac{1}{12} + \frac{1}{132} \right) = \frac{1}{3} + \frac{1}{33}$	AR1		

<p>4 (a)</p>	<p>Multiply $\frac{a}{xy} = \frac{1}{kx} + \frac{1}{ky}$ by kxy</p> $\frac{akxy}{xy} = \frac{kxy}{x} + \frac{kxy}{y} \quad (\text{M1}) \Rightarrow ak = y + x$ $\Rightarrow k = \frac{x+y}{a}$	<p>M1</p>	
	<p>(b) (i)</p> $\frac{1}{6} + \frac{1}{10} = \frac{5}{30} + \frac{3}{30} = \frac{8}{30} = \frac{4}{15}$	<p>C1</p>	
	<p>(ii) $x = 3$ and $y = 5$ (or vice versa) in which case $k = \frac{5+3}{4} = 2$</p>	<p>B1</p>	
	<p>(iii) $x = 1$ and $y = 15$ (or vice versa) in which case $k = \frac{15+1}{4} = 4$ and $\frac{4}{15} = \frac{1}{4} + \frac{1}{60}$</p>	<p>B2</p>	
<p>5</p>	<p>Taking $x = 1$ and $y = 20$ gives $k = 7$ and $\frac{3}{20} = \frac{1}{7} + \frac{1}{140}$</p> <p>Taking $x = 2$ and $y = 10$ gives $k = 4$ and $\frac{3}{20} = \frac{1}{8} + \frac{1}{40}$</p> <p>Taking $x = 4$ and $y = 5$ gives $k = 3$ and $\frac{3}{20} = \frac{1}{12} + \frac{1}{15}$</p>	<p>B1</p> <p>B1</p> <p>B1</p>	

<p>6 (a)</p> <p>$1 = \frac{1}{2} + \frac{1}{2} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ using the pattern in part 2.</p> <p>$1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{4}$</p> <p>(b)</p> <p>In the first result, breaking down $\frac{1}{3}$ gives $1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{12} + \frac{1}{6}$</p> <p>breaking down $\frac{1}{6}$ gives $1 = \frac{1}{2} + \frac{1}{3} + \frac{1}{7} + \frac{1}{42}$</p> <p>OR</p> <p>$1 = \frac{1}{2} + \frac{1}{3} + \frac{1}{10} + \frac{1}{15}$ using the method in question 4, with $x = 2$ and $y = 3$.</p> <p>In the second result, breaking down $\frac{1}{4}$ gives $1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{5} + \frac{1}{20}$</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p>	<p>no penalty if missing</p>
<p>For clear communication and reasoning throughout part A award C2</p>		

Total: 31 marks scaled down to 25.

B Modelling

1	Suitable scales chosen Correct plots	D1D1 P2	P1 for 1 or 2 incorrect.
2	(a) $T = 40$ is incorrect. It should be 36. (b) $T = 0.3 S$	B1 M1 A1	correct form
3	$n = 2$ $B = 0.01 S^2$	B1 A1	
4	(a) $D = 0.3S + 0.01 S^2$ (b) (i) 40 metres (ii) At 30 km/h $D = 18$ metres % reduction = $\frac{22}{40} = 55\%$.	B1 A1A1 A1 A1	(units required) (follow through)
5	(a) braking distance = 180 – thinking distance at 100 km/h = 180 – 30 = 150 metres. So $k 100^2 = 150 \Rightarrow k = 0.015$ $D = 0.3S + 0.015 S^2$ (b) Solve $0.3S + 0.015 S^2 = 88$ 67.2 km/h using graphics calculator.	M1 A1 M1 A1	
	For clear communication and reasoning throughout part B award C2.		

Total: 20 marks scaled down to 15.