



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
International General Certificate of Secondary Education

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**CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/06**

Paper 6 (Extended)

**For Examination from 2010**

SPECIMEN MARK SCHEME

**1 hour 30 minutes**

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**MAXIMUM MARK: 40**

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

<p><b>6 (a)</b></p> <p><math>1 = \frac{1}{2} + \frac{1}{2} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6}</math> using the pattern in part 2.</p> <p><math>1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{4}</math></p> <p><b>(b)</b></p> <p>In the first result, breaking down <math>\frac{1}{3}</math> gives <math>1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{12} + \frac{1}{6}</math></p> <p>breaking down <math>\frac{1}{6}</math> gives <math>1 = \frac{1}{2} + \frac{1}{3} + \frac{1}{7} + \frac{1}{42}</math></p> <p><b>OR</b></p> <p><math>1 = \frac{1}{2} + \frac{1}{3} + \frac{1}{10} + \frac{1}{15}</math> using the method in question 4, with <math>x = 2</math> and <math>y = 3</math>.</p> <p>In the second result, breaking down <math>\frac{1}{4}</math> gives <math>1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{5} + \frac{1}{20}</math></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**

<b>1</b>	Suitable scales chosen Correct plots	D1D1 P2	P1 for 1 or 2 incorrect.
<b>2</b>	<b>(a)</b> $T = 40$ is incorrect. It should be 36. <b>(b)</b> $T = 0.3 S$	B1 M1 A1	correct form
<b>3</b>	$n = 2$ $B = 0.01 S^2$	B1 A1	
<b>4</b>	<b>(a)</b> $D = 0.3S + 0.01 S^2$ <b>(b) (i)</b> 40 metres <b>(ii)</b> At 30 km/h $D = 18$ metres % reduction = $\frac{22}{40} = 55\%$ .	B1 A1A1 A1 A1	(units required)  (follow through)
<b>5</b>	<b>(a)</b> 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>(b)</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>B</b> award C2.		

**Total: 20 marks scaled down to 15.**