

# Mark Scheme with Examiners' Report IGCSE Mathematics Papers 3H & 4H (4400)

June 2005

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Mark Scheme with Examiners' Report

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Q	Working	Answer	Mark	Notes
1.	$\frac{5.8}{3.12}$	1.8589...	2	M1 For 5.8 or 3.12 seen
				A1 For first 5 figures
<b>Total 2 marks</b>				
2.	$10x + 15 = 30$ or $2x + 3 = 6$ $10x = 30 - 15$ or $2x = 6 - 3$	$1\frac{1}{2}$	3	M1 For $10x + 15 = 30$ or $2x + 3 = 6$
				M1 For isolating $x$ term in $ax + b = c$
				A1 For $1\frac{1}{2}$ or $1.5$
<b>Total 3 marks</b>				
3.	$\frac{15}{18} - \frac{8}{18}$	$\frac{7}{18}$	2	M1 For clear attempt to express with common denominator - at least one correct
				A1 cao
<b>Total 2 marks</b>				
4.		correct enlargement	3	B2: for translation of correct shape or 2 vertices correct B1: for one side correct length or for enlargement scale factor 2, centre (2,1)
<b>Total 3 marks</b>				

- |    |   |      |   |    |   |
|----|---|------|---|----|---|
| 5. | (a) $0.45 + 0.12$                         | 0.57 | 2 | M1 | For $0.45 + 0.12$ or $1 - (0.45 + 0.12)$ or $1 - 0.45 - 0.12$ or $0.43$ |
|    |   |      |   | A1 | For 0.57 oe as final answer   |
|    | (b) $250 \times 0.12$ or $250 \times 0.1$ | 30   | 2 | M1 | For $250 \times 0.12$ or $250 \times 0.1$                               |
|    |   |      |   | A1 | cao   |

**Total 4 marks**

- |    |     |                  |   |    |   |
|----|-----|------------------|---|----|---|
| 6. | (a) | $3(3p + 5)$      | 1 | B1 | cao   |
|    | (b) | $q(q - 4)$       | 1 | B1 | cao   |
|    | (c) | $(x + 2)(x - 5)$ | 2 | B2 | (B1 for one correct factor or signs reversed) |

**Total 4 marks**

- |    |   |     |   |    |             |
|----|---|-----|---|----|-------------|
| 7. | (a) $\left(\frac{9+5}{2}\right) \times 6$ | 42  | 2 | M1 |             |
|    |   |     |   | A1 | cao         |
|    | (b) "42" $\times 15$                      | 630 | 2 | M1 |             |
|    |   |     |   | A1 | ft from (a) |

**Total 4 marks**

8.	(a)	eg $\frac{15}{100} \times 240$ or 36 240 - "36"	204	3	M1	Or M2 for $\frac{100-15}{100} \times 240$
					M1	dep on first M1
					A1	cao
	(b)	0.85 oe seen $\frac{663}{0.85}$	780	3	B1	
					M1	For $\frac{663}{0.85}$ or $\frac{663}{1-0.15}$
					A1	cao
<b>Total 6 marks</b>						
9.	(a)	$2x < 8$	$x < 4$	2	M1	
					A1	For $x < 4$ as final answer
	(b)		1, 2, 3	2	B2	(B1 for two correct and none wrong or three correct and one wrong)
<b>Total 4 marks</b>						
10.	(a)	$15 \times 8 + 25 \times 38 + 35 \times 28 + 45$ $\times 4 + 55 \times 2$ $= 120 + 950 + 980 + 180 + 110$ $= 2340$ $2340 \div 80$	29.25	4	M1	For products $m \times f$ where $m$ is consistent inc end points
					M1	(dep)for use of midpoints (15,25... or 15.5,25.5,...)
					M1	(dep on 1 <sup>st</sup> M1) for adding and $\div 80$
					A1	Accept 29, 29.2, 29.3 if first two M1s scored (If 15.5,25.5... used, mean = $\frac{2380}{80} = 29.75$ )

(b)	8, 46, 74, 78, 80	1	B1	cao
(c)	Points correct Curve or line segments	2	B1 B1	$\pm\frac{1}{2}$ sq ft from sensible table ft from points if 4 or 5 points correct or if points are plotted consistently within each interval at the correct heights
(d)	use of 40 (or 40.5) on graph or 40 <sup>th</sup> (or 40.5 <sup>th</sup> ) stated	2	M1 A1	For use of 40 (or 40.5) on graph or 40 <sup>th</sup> (or 40.5 <sup>th</sup> ) stated If M1 scored, ft from cumulative frequency graph If no working, follow through only from correct curve

Total 9 marks

11.	$h^2 = \frac{W}{l}$	2	M1 A1	
	$lh^2$			

Total 2 marks

12.	(a) 30 : 1200 or 1200 : 30 oe	3	M2 A1	For 30 : 1200 or 1200 : 30 oe [M1 for 12(00...) : 30(00...) or 30(00...) : 12(00...) oe] Accept 1 : 0.025, 1 : $\frac{1}{40}$ oe, $n = 40$ ft if M1 scored SC B2 for 1 : 2.5, 1 : 4, 1 : 0.4, 1 : 400, 1 : 25, 1 : 250
	1 : 40			

(b)  $95 \times "40"$  or 3800  
 $"3800" \div 100$

38

3

M1  
M1  
A1

ft from their  $n$

OR  $\frac{95}{30}$   
 $\times 12$

38

3

M1  
M1  
A1

(dep)

**Total 6 marks**

13. (a)  $\frac{360}{18}$

20

2

M1

A1

cao

(b)  $"20" \times (180 - 18)$   
or  $("20" - 2) \times 180$

3240

2

M1

A1

ft from (a)

**Total 4 marks**

14.	$2(x - 1) + 2x + 3 = 4$ <p>or <math>\frac{2(x - 1) + 2x + 3}{4} = 1</math></p> <p>or <math>\frac{2(x - 1)}{4} + \frac{2x + 3}{4} = 1</math></p> $2x - 2 + 2x + 3 = 4$ <p>or <math>\frac{2x - 2 + 2x + 3}{4} = 1</math></p> <p>or <math>\frac{2x - 2}{4} + \frac{2x + 3}{4} = 1</math></p> $4x = 3$	4	<p>M1 Clear attempt to multiply both sides by 4 (or multiple) or expressing LHS with a denominator of 4 or a multiple of 4</p> <p>M1 (dep) expanding brackets or M2 for <math>\frac{x}{2} - \frac{1}{2} + \frac{2x}{4} + \frac{3}{4} = 1</math> (M1 if one error)</p> <p>M1 (dep on first M1) reducing to form <math>ax = b</math> using a correct method or <math>\frac{x}{2} + \frac{2x}{4} = 1 + \frac{1}{2} - \frac{3}{4}</math></p> <p>A1 oe</p>
<b>Total 4 marks</b>			
15.	<p>(a) <math>\frac{10}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}</math></p> <p style="margin-left: 100px;"><math>2\sqrt{5}</math></p> <p>(b) <math>25 + (5\sqrt{3}) + (5\sqrt{3}) + (\sqrt{3})^2</math></p> <p style="margin-left: 100px;"><math>28 + 10\sqrt{3}</math></p>	2  2	<p>M1 Accept <math>10 = k5</math> or <math>\sqrt{20}</math></p> <p>A1 Accept <math>k = 2</math></p> <p>M1 A1 Accept <math>a = 28, b = 10</math></p>
<b>Total 4 marks</b>			



16.	(a)	Angle of elevation identified $50 \tan 19^\circ$	17.2	3	B1 M1 A1	On diagram or implied by working 17.2 or better (17.2163...)
	(b)	$50^2 + 27^2$ or 56.8(2...) or $50^2 + "17.2"{}^2$ or value rounding to 52.88.. $\sqrt{"56.8"{}^2 + "17.2"{}^2}$ or $\sqrt{"52.9"{}^2 + 27^2}$	59.3 - 59.4	3	M1  A1	  For 59.3 - 59.4

Total 6 marks

17.	(a)	$(x + 4)(x + 1) - 15 = 35$ $x^2 + 5x + 4 - 15 = 35$	$x^2 + 5x - 11 = 35$	3	M1 B1 A1	For $(x + 4)(x + 1) - 15 = 35$ or $(x + 1)(x + 4) = 50$ For $x^2 + 5x + 4$ or $x^2 + x + 4x + 4$ For $x^2 + 5x + 4 - 15 = 35$ or $x^2 + 5x + 4 = 50$ or simpler
	OR	$(x + 1)(x - 1) + 5(x - 2) = 35$ $x^2 + x - x - 1 + 5x - 10$	$x^2 + 5x - 11 = 35$	3	M1 B1 A1	For $(x + 1)(x - 1) + 5(x - 2) = 35$  For $x^2 + x - x - 1 + 5x - 10$ or simpler For $x^2 + 5x - 1 - 10 = 35$
	(b)	$\frac{-5 \pm \sqrt{5^2 - 4 \times -46}}{2}$ $\frac{-5 \pm \sqrt{209}}{2}$	4.73	3	M1  M1 A1	  May be implied by an answer of 4.75 For 4.73 or better (4.7284...) Accept 4.73 and -9.73 or better

Total 6 marks

18.	(a)	$\frac{9.4}{\sin 123^\circ} = \frac{AC}{\sin 35^\circ}$ $AC = \frac{9.4 \sin 35^\circ}{\sin 123^\circ}$	3	M1	
		6.43		M1	
				A1	For 6.43 or better (6.4287...)
	(b)	$\frac{1}{2} \times 9.4 \times \text{"6.43"} \times \sin x^\circ$ or $\frac{1}{2} \times AB \times \text{"6.43"} \times \sin 123^\circ$ or $\frac{1}{2} \times AB \times 9.4 \times \sin 35^\circ$	3	M1 B1	For clear attempt to use " $\frac{1}{2}absinC$ " For $x = 22$ or $AB = 4.2$ or better (4.1987...) appropriate for their form of $\frac{1}{2}absinC$ If M0, award for $x = 22$ or $AB = 4.2$ or better (may be shown on diagram)
		11.3		A1	11.3 or better (11.3188); ft from (a)
<b>Total 6 marks</b>					
19.	(a)	$\frac{3}{6} \times \frac{2}{6}$	2	M1	
		$\frac{6}{36}$		A1	
	(b)	$\frac{1}{6} \times \frac{1}{6} + \frac{3}{6} \times \frac{3}{6} + \frac{2}{6} \times \frac{2}{6}$ $= \frac{1}{36} + \frac{9}{36} + \frac{4}{36}$	4	M1 M1 M1	1 correct product All 3 correct products Summing at least 2 correct products
		$\frac{14}{36}$		A1	

OR BB BA BN BA BN BA  
 AB AA AN AA AN AA  
 NB NA NN NA NN NA  
 AB AA AN AA AN AA  
 NB NA NN NA NN NA  
 AB AA AN AA AN AA

$$\frac{14}{36}$$

4

M3

List of all 36 combinations  
 M2 for 1 omission  
 M1 for 15 or more combinations

A1

Total 6 marks

20.

(a)

16

1

B1

cao

(b)

$x^3 - 7x + 9 = 11 - x$   
 or  $-x + 11$  oe seen  
 line  $x + y = 11$  drawn

3

M1

May be implied by line  $x + y = 11$

M1

A1

Accept coordinates ft from  
 candidate's line if first M1 scored,  
 line has negative gradient and there  
 are 3 points of intersection

$\sim -2.3, -0.3, 2.6$

Total 4 marks

21.

(a)

$\frac{2512}{157}$  or 16 or  $\frac{157}{2512}$  or 0.0625  
 $\sqrt{16}$  or 4 or  $\frac{1}{4}$

3

M1

M1

For  $\sqrt{16}$  or 4 or  $26^2 \times \frac{157}{2512}$  (42.25)

A1

cao

6.5

(b)  $4^3$  or 64

8320

2

M1

A1

cao

Total 5 marks

22.

$$\frac{2}{x-1} + \frac{x-11}{(x-1)(x+4)}$$

$$\frac{2(x+4) + (x-11)}{(x-1)(x+4)}$$

or

$$\frac{2(x+4)}{(x-1)(x+4)} + \frac{x-11}{(x-1)(x+4)}$$

$$\frac{2x+8+x-11}{(x-1)(x+4)}$$

$$\frac{3x-3}{(x-1)(x+4)}$$

$$\frac{3(x-1)}{(x-1)(x+4)}$$

$$\frac{3}{(x+4)}$$

6

B1

For factorising  $x^2 + 3x - 4$ 

B1

For correct single fraction even if unsimplified, or for correct sum of two fractions with the same denominator ft from incorrect factorisation

B1

For expanding brackets correctly in numerator

B1

For simplifying their numerator

B1

For factorising a correct numerator

B1

cao

SC If no denominator, award 3rd B1 for  $2x + 8 + x - 11$  or $2x^2 + 6x - 8 + x^2 - 11x - x + 11$ and 4th B1 for  $3x - 3$  or  $3x^2 - 6x + 3$ 

Total 6 marks

TOTAL FOR PAPER: 100 MARKS