



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Mathematics B

3302 Module 5

Paper 2 Higher

Copyright © 2003 AQA and its licensors. All rights reserved.

1	$3^2 + 1.2^2$ (= 10.44)	M1	Must add two squares																															
	$\sqrt{\text{their } 10.44}$	M1	Dependent on first M1																															
	3.2 or 3.23...	A1	Note: 3.2 scores A0 Answer = 3 with no working scores M0																															
2	Trial between 2 and 3 correctly evaluated to the nearest whole number	B1	Working must be seen All trials must be correctly evaluated and either rounded or truncated and given to at least 1 dp																															
	Trials between 2.3 and 2.4 inclusive that bracket the answer	B1																																
	Trial at 2.35 or 2.36 or 2.37 and 2.4 stated as answer	B1																																
			<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 15%; text-align: right;">2.3</td> <td style="width: 15%; text-align: right;">28.267</td> <td style="width: 15%; text-align: right;">2.7</td> <td style="width: 15%; text-align: right;">38.583</td> </tr> <tr> <td style="text-align: right;">2.4</td> <td style="text-align: right;">30.624</td> <td style="text-align: right;">2.8</td> <td style="text-align: right;">41.552</td> </tr> <tr> <td style="text-align: right;">2.5</td> <td style="text-align: right;">33.125</td> <td style="text-align: right;">2.9</td> <td style="text-align: right;">44.689</td> </tr> <tr> <td style="text-align: right;">2.6</td> <td style="text-align: right;">35.776</td> <td></td> <td></td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td style="text-align: right;">2.35</td> <td style="text-align: right;">29.427875</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">2.36</td> <td style="text-align: right;">29.664256</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">2.37</td> <td style="text-align: right;">29.902053</td> <td></td> <td></td> </tr> </tbody> </table> <p>Marks for possible misreads $x^3 + 7$ and answer 2.8 B1 $x^2 + 7x$ and answer 3 B0 $x^3 - 7x$ (no answer between 2 and 3) B0</p>	2.3	28.267	2.7	38.583	2.4	30.624	2.8	41.552	2.5	33.125	2.9	44.689	2.6	35.776							2.35	29.427875			2.36	29.664256			2.37	29.902053	
2.3	28.267	2.7	38.583																															
2.4	30.624	2.8	41.552																															
2.5	33.125	2.9	44.689																															
2.6	35.776																																	
2.35	29.427875																																	
2.36	29.664256																																	
2.37	29.902053																																	
3	$\pi \times 9^2$	M1	Or 254 (. ...) seen																															
	$\pi \times 5^2$	M1	Or 78 (. ...) or 79 seen																															
	Subtracting	M1 dep	Dependent on both previous M1s																															
	176 (or 56π)	A1	Accept 175.8 to 176 Using 18^2 and $10^2 \Rightarrow 703.2$ to 704 SC2																															
	cm^2	B1	<i>Note: units mark</i>																															
4	$2x + 10$ seen	B1																																
	$6x$ and/or -3 seen	M1	Or $-6x$ or 3																															
	$x = -\frac{1}{2}$	A1	Do not accept $\frac{-3}{6}$																															
5(a)	r^4 should be r^3	B1	oe eg should be 3 dimensions r^4 is too many r^4 is wrong Note: an incorrect statement given nullifies a correct one in (a) and (b)																															
(b)	$2q$ is not 2-dimensional	B1	oe eg $2q$ is wrong $2q$ should be q^2																															

6(a)	$1 \leq n < 6$	M1	oe
	1 2 3 4 5	A2	A1 for 4 correct or if 6 included – 1 for each extra number
(b)	i) $y = \frac{1}{2}x$	B1	oe
	ii) $y \geq 0$	B1	Accept $y > 0$ or $0 \leq y \leq 3$
	$x \leq 6$	B1	Accept $x < 6$ or $0 \leq x \leq 6$
	$y \leq \frac{1}{2}x$	B1 ft	ft their (b)(i) Accept $y < \frac{1}{2}x$ or $x \geq 2y$ oe SC1 all 3 boundaries given as equations SC2 all 3 boundaries given as inequalities the wrong way round

7	$\frac{SQ}{14} = \cos 25^\circ$	M1	
	$SQ = 14 \times \cos 25^\circ (= 12.68\dots)$	M1	
	$\frac{\text{their } SQ}{8.6} = \tan R$	M1	Award this M1 only if SQ has been found by an attempt at trigonometry
	1.475... or 1.48	A1 ft	ft their SQ
	55.87 or 55.9 or 56	A1	

8(a)	$3x(x - 2y)$	B2	B1 for $3x(x\dots)$ or $3(x^2 - 2xy)$ or $x(3x - 6y)$ or $3x(\dots - 2y)$
(b)	$(y \pm a)(y \pm b)$ where $ab = 14$	M1	a and b must be integers
	$(y - 7)(y - 2)$	A1	Ignore solution of equation following correct brackets

9	Scale factor $\frac{9}{6}$ or $\frac{6}{9}$ or $\frac{6}{4}$ or $\frac{4}{6}$	M1	oe
	$AB = (\text{their } 1.5) \times 4$	A1	Or $9 \div (\text{their } 1.5)$
	$DB = 2$	A1	Alternative: $\frac{4}{4+x} = \frac{6}{9}$ or $\frac{4+x}{4} = \frac{9}{6}$ M1 $36 = 24 + 6x$ M1 $x = 2$ A1

10	Substituting in formula: $\frac{-4 \pm \sqrt{(4)^2 - 4 \times 1 \times -10}}{2}$	M1	Allow one error Errors are: wrong sign for b (+ 4) b^2 wrong (= 8 or - 16) $-4ac = -40$ M0 for any of the following: Not dividing whole of top line by $2a$ Using wrong values for a , b and/or c Forgetting square root Mis-copying formula
	- 5.74	A1	Note: some working must be seen answers without working scores M0 A0 A0 1.7 and - 5.7 or 1.741 and - 5.741 M1 A1 A0 Alternative method (completing the square): $(x + 2)^2 - 14 = 0$ M1 $x = -2 \pm \sqrt{14}$ A1 $x = -5.74, 1.74$ (both) A1
	1.74	A1	
11	1.5^3 ($\times 480$)	M1	Accept 1.5^3 0.666^3 0.66^3 0.67^3 or attempt at $\frac{30}{20}$ cubed
	1620	A1	
12	$AB = DC$ (given)	B1	“given” may be omitted
	$\angle ABE = \angle CDE$ alternate (angles)	B2	Accept Z angles instead of alternate angles Any 2 of these for B2 Reasons must be stated
	$\angle BAE = \angle DCE$ alternate (angles)		
	$\angle AEB = \angle CED$ opposite (angles)		
	Congruent because AAS or ASA or SAA	B1 dep	This is dependent on the first B1 Do not accept ‘congruent because angles and sides are the same’ Alternative method: $ABCD$ is a parallelogram B1 $AE = EC, DE = EB$, angles at E or $AB = DC$ (all 3 needed) B2 Congruent because SAS or SSS B1
Angle 82°	B1	May be from working or seen on diagram	
13	$18^2 + 25^2 - 2 \times 18 \times 25 \times \cos 82^\circ$	M1	$324 + 625 - 900 \times \cos$ (their angle) ft their angle, but not 70° or 152°
	$x^2 = 823.7(\dots)$	A1 ft	Note: $x = 49 \cos 82$ or 6.81948... scores M1 A0 A0
	28.7	A1 ft	Follow through on an incorrect angle only 62° gives $\sqrt{526.47\dots} = 22.9(\dots)$ 72° gives $\sqrt{670.88\dots} = 25.9(\dots)$ 92° gives $\sqrt{980.409\dots} = 31.3(\dots)$ Special cases: $70^\circ \Rightarrow 25.3(2\dots)$ SC2 $152^\circ \Rightarrow 41.7(5\dots)$ SC2

14	$(x + 5)(x - 2) (=) \frac{1}{2}x(x + 8)$	M1	For setting up both areas correctly
	$x^2 + 3x - 10$	M1	This mark is independent of the first M1 Accept $x^2 + 5x - 3x - 10$
	$2(\text{their } x^2 + 3x - 10) = (\text{their } x^2 + 8x)$	M1 dep	This mark is dependent on the first M1 or their $(x^2 + 3x - 10) = \text{their } (x^2 + 8x)$ halved
	$x^2 - 2x - 20 = 0$	A1	

15(a)	$a = 3$	B1	
	$(x - 3)^2 = x^2 - 6x + 9$	M1	Or $a^2 + b = 13$ or $3^2 + b = 13$
	$b = 4$	A1	
(b)	4	B1 ft	ft from their b

16	$x(x - 1) - 2(x + 1)$	M1	Allow invisible brackets if recovered later $x^2 - 3x - 2$ seen as first line M1 A0
	$x^2 - 3x - 2$	A1	Accept uncollected terms eg $x^2 - x - 2x - 2$
	$(x + 1)(x - 1)$	M1	Accept $x^2 - 1$ as common denominator or RHS
	Their $(x^2 - 3x - 2) = \text{their } (x^2 - 1)$	M1 dep	Dependent on first two M1s
	$(x =) - \frac{1}{3}$	A1	Accept $-0.33(\dots)$

17	$(AC^2 =) 20^2 + 14^2 (= 596)$	M1	Or $10^2 + 7^2$
	$\sqrt{\text{their } 596 (= 24.4\dots)}$	M1	Or $\sqrt{149}$
	$\frac{1}{2} (\text{their } 24.4) \div 16 = \cos \theta$	M1 dep	Dependent on both previous M1s
	0.763 or 0.7629... or 0.7625	A1	
	40.27 to 40.54	A1	

18	$(x \pm a)(5x \pm b)$	M1	Give M1 for attempt to factorise into $(x \pm a)(5x \pm b)$ where a, b are integers and $ab = 3$
	$(x + 3)(5x - 1)$	A1	
	$(x + 3)(x - 3)$	B1	
	$\frac{5x - 1}{x - 3}$	B1	Do not award this B1 if candidate has given further working