AQA Qualifications

AQA Level 2 Certificate

FURTHER MATHEMATICS

Level 2 (8360)

Mark Scheme

Worksheet 12

Algebraic Problems – including ratio

Version 2.0

Our specification is published on our website (www.aqa.org.uk). We will let centres know in writing about any changes to the specification. We will also publish changes on our website. The definitive version of our specification will always be the one on our website, this may differ from printed versions.

You can get further copies of this Teacher Resource from:
The GCSE Mathematics Department
AQA
Devas Street
Manchester
M16 6EX

Or, you can download a copy from our All About Maths website (http://allaboutmaths.aqa.org.uk/).

Copyright © 2012 AQA and its licensors. All rights reserved.

AQA retains the copyright on all its publications, including the specifications. However, registered centres for AQA are permitted to copy material from this specification booklet for their own internal use.

AQA Education (AQA) is a registered charity (number 1073334) and a company limited by guarantee registered in England and Wales (number 3644723). Our registered address is AQA, Devas Street, Manchester M15 6EX.

Glossary for Mark Schemes

These examinations are marked in such a way as to award positive achievement wherever possible. Thus, for these papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
M Dep	A method mark dependent on a previous method mark being awarded.
B Dep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

12 Algebraic Problems – including ratio

Question	Answer	Mark	Comments
1	$n = 4$	M1	
	$\frac{1}{2}$	A1	
	$n = -4$	M1	
	$\frac{9}{10}$	A1	
2(a)	$\frac{x}{y} = \frac{6}{5}$	M1	
	$x = \frac{6y}{5}$	A1	oe
2(b)	$\frac{6y}{5} + \frac{15y}{5} : \frac{12y}{5} - \frac{5y}{5}$	M1	oe $6 + 3 \times 5 : 2 \times 6 - 5$
	$\frac{21(y)}{(5)} : \frac{7(y)}{(5)}$	A1	
3	$\frac{3}{10}$ of $(6a - a)$ **or** $\frac{3}{10}$ of $(11b - b)$	M1	oe
	$(2.5a, 4b)$	A2	oe A1 For each coordinate SC2 $(1.5a, 3b)$
4	$\frac{a + 3b}{a + 7b} = \frac{2}{5}$	M1	
	$5a + 15b = 2a + 14b$	M1	Allow one error
	$3a + b = 0$	A1	oe
	$a + b = -4$ $2a = 4$	A1 ft	
	$a = 2$ and $b = -6$	A1 ft	

Question	Answer	Mark	Comments
5	$\frac{a}{b} = \frac{4}{3}$	M1	oe
	$b = \frac{3a}{4}$	A1	$a = \frac{4b}{3}$
	$a \times \frac{3a}{4} + a = 5$	M1	$\frac{4b}{3} \times b + \frac{4b}{3} = 5$
	$3a^2 + 4a - 20 = 0$	A1	$4b^2 + 4b - 15 = 0$
	$(3a + 10)(a - 2) = 0$	M1	$(2b + 5)(2b - 3)$
	$a = -\frac{10}{3}$ $a = 2$	A1 ft	$b = -\frac{5}{2}$ $b = \frac{3}{2}$
	$b = -\frac{5}{2}$ $b = \frac{3}{2}$	A1 ft	$a = -\frac{10}{3}$ $a = 2$
6	Let their ages 6 years ago be $8x$ and $5x$	M1	
	$8x + 5x = 90 - 12$	M1	Allow 90 – 6 for M1
	$13x = 78$ $(x = 6)$	A1	
	Their 6 × 8 and their 6 × 5 (48) (30)	M1	
	54 and 36	A1	
Alt 6	$x + y = 90$	M1	
	$\frac{x - 6}{y - 6} = \frac{8}{5}$	M1	
	$18 = 8y - 5x$	A1	
	Eliminates a letter	M1	
	$(x =)$ 54 and $(y =)$ 36	A1	

Question	Answer	Mark	Comments
7	x, x and $180 - 2x$ seen or on diagram	M1	
	$\frac{x}{y} = \frac{4}{5}$	M1	
	$x = \frac{4y}{5}$	A1	oe
	$2y = 180 - 2x$ (or $y = 90 - x$)	M1	oe
	$y = 90 - \frac{4y}{5}$	M1	oe
	$\frac{9y}{5} = 90$	M1	oe
	$y = 50$	A1	
8	$a = 7x + 18$ or $b = 3x + 18$	B1	oe
	$\frac{\text{their}(7x + 18)}{\text{their}(3x + 18)} = \frac{3}{2}$	M1	
	$14x + 36 = 9x + 54$	M1	Rearranging
	$5x = 18$	M1	Solving
	$x = 3.6$	A1	
9(a)	$x : y = 6 : 10$	M1	oe
	$x : y : z = 6 : 10 : 9$	M1	
	$x : z = 2 : 3$	A1	
9(b)	$3 \times 10 : 7 \times 5$	M1	oe
	$6 : 7$	A1	
9(c)	$3 + 5 : 5$	M1	$\frac{x + y}{y} = \frac{x}{y} + 1$ or $\frac{3}{5} + 1$
	$8 : 5$	A1	

Question	Answer	Mark	Comments
10	$(2n)^2 + n^2$	M1	oe
	$(2n)^2 + n^2 + (n-1)^2 = (2n+1)^2$	M1	
	$4n^2 + n^2 + n^2 - n - n + 1$ $= 4n^2 + 2n + 2n + 1$	M1	Allow one error
	$2n^2 - 6n = 0$	M1	Rearranging ; or $2n^2 = 6n$
	$2n(n-3) = 0$	M1	(allow ÷ by n) $2n = 6$
	$n = 3$	A1	