AQA Level 2 Certificate
FURTHER MATHEMATICS
Level 2 (8360)

Mark Scheme
Worksheet 12
Algebraic Problems – including ratio

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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	
	$\dfrac{1}{2}$	A1	
	$n = -4$	M1	
	$\dfrac{9}{10}$	A1	
2(a)	$\dfrac{x}{y} = \dfrac{6}{5}$	M1	
	$x = \dfrac{6y}{5}$	A1	oe
2(b)	$\dfrac{6y}{5} + \dfrac{15y}{5} : \dfrac{12y}{5} - \dfrac{5y}{5}$	M1	oe $6 + 3 \times 5 : 2 \times 6 - 5$
	$\dfrac{21(y)}{(5)} : \dfrac{7(y)}{(5)}$	A1	
3	$\dfrac{3}{10}$ of $(6a - a)$ **or** $\dfrac{3}{10}$ of $(11b - b)$	M1	oe
	$(2.5a, 4b)$	A2	oe A1 For each coordinate SC2 $(1.5a, 3b)$
4	$\dfrac{a + 3b}{a + 7b} = \dfrac{2}{5}$	M1	
	$5a + 15b = 2a + 14b$	M1	Allow one error
	$3a + b = 0$	A1	oe
	$a + b = -4$ $\quad 2a = 4$	A1ft	
	$a = 2$ and $b = -6$	A1ft	

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Question	Answer	Mark	Comments
5	$\dfrac{a}{b} = \dfrac{4}{3}$	M1	oe
	$b = \dfrac{3a}{4}$	A1	$a = \dfrac{4b}{3}$
	$a \times \dfrac{3a}{4} + a = 5$	M1	$\dfrac{4b}{3} \times b + \dfrac{4b}{3} = 5$
	$3a^2 + 4a - 20 = 0$	A1	$4b^2 + 4b - 15 = 0$
	$(3a + 10)(a - 2) = 0$	M1	$(2b + 5)(2b - 3)$
	$a = -\dfrac{10}{3} \qquad a = 2$	A1 ft	$b = -\dfrac{5}{2} \qquad b = \dfrac{3}{2}$
	$b = -\dfrac{5}{2} \qquad b = \dfrac{3}{2}$	A1 ft	$a = -\dfrac{10}{3} \qquad a = 2$

Question	Answer	Mark	Comments
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	
	$\dfrac{x - 6}{y - 6} = \dfrac{8}{5}$	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	
	$\dfrac{x}{y} = \dfrac{4}{5}$	M1	
	$x = \dfrac{4y}{5}$	A1	oe
	$2y = 180 - 2x$ (or $y = 90 - x$)	M1	oe
	$y = 90 - \dfrac{4y}{5}$	M1	oe
	$\dfrac{9y}{5} = 90$	M1	oe
	$y = 50$	A1	

Question	Answer	Mark	Comments
8	$a = 7x + 18$ or $b = 3x + 18$	B1	oe
	$\dfrac{\text{their } (7x + 18)}{\text{their } (3x + 18)} = \dfrac{3}{2}$	M1	
	$14x + 36 = 9x + 54$	M1	Rearranging
	$5x = 18$	M1	Solving
	$x = 3.6$	A1	

Question	Answer	Mark	Comments
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	$\dfrac{x + y}{y} = \dfrac{x}{y} + 1$ or $\dfrac{3}{5} + 1$
	$8 : 5$	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	