

Level 3 Algebra – Algebraic Fractions - Answers

June 2013 - Question 7

Question	Working	Answer	Mark	Notes
7	(a)	$2x^2 - 11x - 6$	2	M1 for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs A1 for $2x^2 - 11x - 6$
	(b)	$\frac{x}{x+5}$	2	M1 for factorisation of numerator or denominator A1 for $\frac{x}{x+5}$

Jan 2014 - Question 7

Question	Working	Answer	Mark	Notes
7		$\frac{-3}{x(3x-2)}$	3	M1 for correct method to combine the fractions M1(dep) for full simplification of the numerator A1 for $\frac{-3}{x(3x-2)}$ or $\frac{3}{x(2-3x)}$ or $\frac{-3}{3x^2-2x}$ or $\frac{3}{2x-3x^2}$

Jan 2015 - Question 6

6	(a)	$3x^2 - 11x + 10$	2	M1 for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs A1 for $3x^2 - 11x + 10$
	(b)	$\frac{1}{x-2}$	2	M1 for a correct factorisation of denominator into linear factors, $(3x-5)(2x-4)$ or $2(3x-5)(x-2)$ or $(6x-10)(x-2)$ A1 for $\frac{1}{x-2}$

June 2015 - Question 10

Question	Working	Answer	Mark	Notes
10	(a)	$2x^2 + 5x - 12$	2	M1 for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs A1 cao
	(b)	x^{-9}	1	B1 cao
	(c)	$2y^2$	1	B1 cao
	(d)	$\frac{2x^2 - 2x + 6}{(x-3)(x+3)}$	3	M1 for using a correct common denominator A1 $\frac{(x)(x+3)+(x-2)(x-3)}{(x-3)(x+3)}$ oe A1 $\frac{2x^2-2x+6}{(x-3)(x+3)}$ or $\frac{2(x^2-x+3)}{(x-3)(x+3)}$ or $\frac{2x^2-2x+6}{(x^2-9)}$ or $\frac{2(x^2-x+3)}{(x^2-9)}$

Jan 2016 - Question 1

Question	Working	Answer	Mark	Notes
1 (a)		$p^2 - 1$	1	B1 cao
(b)		$4q^2 - 4q + 1$	2	M1 for at least 3 correct terms within 4 terms A1 cao
(c)		$a = \frac{1}{125}, n = -6$	2	B1 for $a = \frac{1}{125}$ B1 for $n = -6$
(d)		$8z^2$	2	B2 cao (B1 for $az^2, a \neq 8$ or $8z^n, n \neq 2$ or $-8z^n$ or $\neq 8z^2$)
(e)		$\frac{x-1}{x+8}$	2	M1 for $(x-1)(x+8)$ A1 cao

June 2016 - Question 7

Question	Working	Answer	Mark	Notes
7 (a)		e^{-1}	1	B1 oe
(b)		$\frac{n^6}{4}$	2	M1 for inverting the fraction, or squaring the fraction A1 cao
(c)	$\frac{2x(x-3)+7(x+3)}{(x+3)(x-3)}$	$\frac{2x^2+x+21}{(x+3)(x-3)}$	3	M1 for using a correct common denominator, eg $(x+3)(x-3)$ M1 for $\frac{2x(x-3)+7(x+3)}{(x+3)(x-3)}$ oe A1 for $\frac{2x^2+x+21}{(x+3)(x-3)}$ or $\frac{2x^2+x+21}{x^2-9}$

Jan 2017 - Question 3

3 (a)		$m^{\frac{5}{4}}$	1	B1
(b)		n^5	1	B1 (allow $\frac{1}{n^5}$)
(c)		$a = 8, n = 9$	2	B1 for $a = 8$ B1 for $n = 9$
(d)		$5 - 21y + 4y^2$	2	M1 for at least 3 correct terms within 4 terms A1
(e)		$\frac{1}{u-2}$	2	M1 for factorisation of $u^2 - 4u + 4$ A1

June 2017 - Question 2

2 (a)	$14x^2 + 10x - 21x - 15$	$14x^2 - 11x - 15$	2	M1 for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs A1 for $14x^2 - 11x - 15$
(b)		$\frac{5x^2 - 6x - 12}{(3x+4)(2x-1)}$	3	M1 for using a correct common denominator A1 for $\frac{x(2x-1)+(x-3)(3x+4)}{(3x+4)(2x-1)}$ A1 for $\frac{5x^2-6x-12}{(3x+4)(2x-1)}$ or $\frac{5x^2-6x-12}{6x^2+5x-4}$

Jan 2018 - Question 5

Question	Working	Answer	Mark	Notes
5 (i)		$(x-7)(x+7)$	4	B1
(ii)		$\frac{x-7}{x}$		M1 for complete factorisation or multiplying and inverting second fraction M1 for complete factorisation AND multiplying and inverting second fraction A1 for $\frac{x-7}{x}$ or $1 - \frac{7}{x}$

June 2018 - Question 16

Question	Working	Answer	Mark	Notes
16 (a)		$\frac{3x-8y}{5(x-y)(x+y)}$	4	M1 for correct factorisation of $x^2 - y^2$, eg $(x-y)(x+y)$ M1 for finding a common denominator, eg $5(x-y)(x+y)$ or $(5x+5y)(x^2-y^2)$ M1 (dep M1) for correct method to combine fractions A1 for $\frac{3x-8y}{5(x-y)(x+y)}$ or $\frac{3x-8y}{(5x-5y)(x+y)}$ or $\frac{3x-8y}{(x-y)(5x+5y)}$ or $\frac{3x-8y}{5(x^2-y^2)}$ or $\frac{3x-8y}{5x^2-5y^2}$
(b)		$\frac{3\sqrt{p}-1}{2}$	3	M1 for correct method to rationalise, eg multiplying by $\frac{\sqrt{p}}{\sqrt{p}}$ oe M1 for $3p\sqrt{p}-p$ and $2p$ or $6p\sqrt{p}-2p$ and $4p$ oe A1 $\frac{3\sqrt{p}-1}{2}$ or $\frac{3\sqrt{p}}{2} - \frac{1}{2}$

Jan 2019 - Question 5

Question	Working	Answer	Mark	Notes
5 (a)		$2p^{-\frac{1}{2}}$	2	B2 for $2p^{-\frac{1}{2}}$ oe (B1 for $2p^n$ where $n \neq -\frac{1}{2}$ or $ap^{-\frac{1}{2}}$ oe where $a \neq 2$)
(b)		$u^{\frac{3}{2}}m^{\frac{5}{2}}$	2	M1 for correct first step, eg $\frac{u^2}{m^{\frac{1}{2}}} \times \frac{m^3}{u^{\frac{1}{2}}}$ A1 for $u^{\frac{3}{2}}m^{\frac{5}{2}}$
(c)		$\frac{-7x+3}{(x+3)(x-3)}$	3	M1 for using a correct common denominator A1 for $\frac{(x-1)(x-3)-x(x+3)}{(x+3)(x-3)}$ oe A1 for $\frac{-7x+3}{(x+3)(x-3)}$ or equivalent simplest form

June 2019 - Question 16

16		$\frac{20x-3}{4x^2-9}$	3	M1 for using $(2x-3)(2x+3)$ as the common denominator M1 (dep M1) for a complete method to simplify to a single fraction A1 $\frac{20x-3}{4x^2-9}$ or $\frac{20x-3}{(2x-3)(2x+3)}$
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Jan 2020 - Question 7

7	(a)		p^8	1	B1 cao
	(b)		$64t^3$	2	B2 cao (B1 for $64t^n$, $n \neq 3$ or ct^3 , $c \neq 64$)
	(c)		$\frac{1}{x^2 - 9}$	2	M1 for $x^2 - 9 = (x + 3)(x - 3)$ or for $(x - 3)^2(x + 3)^2 = (x^2 - 9)^2$ A1 for $\frac{1}{x^2 - 9}$ or $\frac{1}{(x+3)(x-3)}$

Jan 2021 - Question 5

5			$\frac{2x^2 + 12}{(x - 3)(x + 3)}$	3	M1 for using a suitable common denominator eg $(x - 3)(x + 3)$ M1 for a complete method to simplify to a single fraction, eg $\frac{(x+2)(x+3)+(x-2)(x-3)}{(x-3)(x+3)}$ A1 $\frac{2x^2+12}{x^2-9}$ or $\frac{2x^2+12}{(x-3)(x+3)}$ or $\frac{2(x^2+6)}{x^2-9}$ or $\frac{2(x^2+6)}{(x-3)(x+3)}$
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Jan 2022 - Question 1

Question	Working	Answer	Mark	Notes
1 (a)		$4c^2 - 9d^2$	2	M1 for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs or $(2c)^2 - (3d)^2$ A1 for $4c^2 - 9d^2$
(b)		y^3	1	B1 cao
(c)		$27p^3$	2	B2 cao (B1 for $27p^n$, $n \neq 3$ or cp^3 , $c \neq 27$ or $(3p)^3$)
(d)		$\frac{2x}{(x + 2)^2}$	3	M1 for using a correct common denominator A1 for $\frac{x(x+2)-x^2}{(x+2)^2}$ oe A1 for $\frac{2x}{(x+2)^2}$

Jan 2023 - Question 2

2	(a)		$3a(a-2c)$	1	B1 oe
	(b)		$(3y+5)(4x-3)$	2	M1 for $3y(4x - 3)$ and $5(4x - 3)$ or $4x(3y + 5)$ and $-3(3y + 5)$ A1 $(3y+5)(4x-3)$
	(c)		$(5e-6h)(5e+6h)$	1	B1 $(5e-6h)(5e+6h)$
	(d)		$\frac{3}{2}$	2	M1 for factorising $2w + 4 = 2(w + 2)$ or $3w - 6 = 3(w - 2)$ or $3(w^2-4)$ and $2(w^2-4)$ A1 oe

June 2023 - Question 6

6		$\frac{1}{x-2}$	3	<p>M1 for one correct factorisation, $(x-2)(x+3)$ or $(x-3)(x+3)$ or for inverting the second fraction and multiplying</p> <p>M1 for a correct full expression with both factorisations, $(x-2)(x+3)$ and $(x-3)(x+3)$ or for a correct full expression with one factorisation and inverting second fraction and multiplying</p> <p>A1 cao</p>
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Jan 2024 - Question 22

Question	Working	Answer	Mark	Notes
22 (a)		$\frac{x}{x-2}$	2	<p>M1 for factorisation, eg $x(x-3)$ or $(x-2)(x-3)$</p> <p>A1 cao</p>
(b)		$0, -\frac{3}{2}$	4	<p>M1 for writing as a single fraction, eg $\frac{1(x+2)+2(x+1)}{(x+1)(x+2)}$ or deals with the fractions, eg $1(x+2) + 2(x+1) = 2(x+1)(x+2)$</p> <p>M1 for dealing with the fractions and expanding brackets, eg $x+2 + 2x+2 = 2x^2 + 6x + 4$</p> <p>M1 for writing equation in the form $ax^2 + bx + c = 0$, eg $2x^2 + 3x = 0$</p> <p>A1 oe</p>