Level 3 Algebra - Indices - Answers

June 2013 - Question 1

1	(a)		m^6	1	B1 cao
	(b)		$n^{\frac{5}{2}}$	1	B1 for $n^{\frac{5}{2}}$ (accept $n^{2.5}$)
	(c)		p^2	1	B1 cao
	(d)	$d^{-1}(d^2 - d^{\frac{1}{2}})$ $d - d^{\frac{-1}{2}}$	$1, -\frac{1}{2}$	3	M1 for method to enable simplification, eg $d^{-1}(d^2 - d^{\frac{1}{2}})$ or $\frac{d^2}{d} - \frac{d^{\frac{1}{2}}}{d}$ A1 $x = 1$ A1 $y = -\frac{1}{2}$

Jan 2014 - Question 1

1	(a)	x^{6-1}	x^5	1	B1 cao
	(b)	y^{-2+-3}	y^{-5}	1	B1 cao
	(c)		v^2	1	B1 cao
	(d)	$\frac{w^2}{w}$	w	2	M1 for correct method for partial simplification A1 for w (accept w^1)

Jan 2015 - Question 1

1	(a)		p^8	1	B1 cao
	(b)		$q^{\frac{5}{2}}$	1	B1 oe
	(c)		t^2	1	B1 cao
	(d)	$w^{-1}(w - w^{\frac{1}{3}})$	$1, -\frac{2}{3}$	3	M1 for method to enable simplification, eg $w^{-1}(w - w^{\frac{1}{3}})$ or $\frac{w}{w} - \frac{w^{\frac{1}{3}}}{w}$ A1 $a = 1$ A1 $b = -\frac{2}{3}$

June 2017 - Question 3

3	(a)		$16t^{12}$	1	B1 cao
	(b)		$w^{5/2}$	1	B1 oe
	(c)		p^2	1	B1 cao
	(d)		$\frac{1}{2}, \frac{3}{2}$	3	M1 for a first step eg division throughout by q or removal of $q^{\frac{3}{2}}$ as a factor A1 for $a = \frac{1}{2}$ oe A1 for $b = \frac{3}{2}$ oe

Jan 2018 - Question 8

8	(a)		x^2	1	B1 cao
	(b)		$64y^2$	2	M1 for $4^3(=64)$ or $y^3 \times \frac{2}{3}$ $(=y^2)$ A1 cao
	(c)		$a=3, b=-2, n=4$	2	B2 for all 3 correct values (B1 for 2 correct values)
	(d)		$24y$	2	M1 for one correct expansion or use of difference of 2 squares A1 cao

June 2018 - Question 1

1	(a)		$3x^2$	1	B1 cao
	(b)		a^{10}	1	B1 cao
	(c)		x^6	1	B1 cao
	(d)		$d=4, f=\frac{3}{2}$	3	M1 a correct first step eg $4q^2$ or $\frac{7}{2}-2$ oe A1 for $d=4$ A1 for $f=\frac{3}{2}$ oe

Jan 2019 - Question 5

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 14

14	(a)		$64x^2$	2	B2 for $64x^2$ (B1 for 64 or x^2)
	(b)		$a=\frac{1}{8}, b=-9$	2	B1 for $a=\frac{1}{8}$ B1 for $b=-9$

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 1

1	(a)		$6x^2 + 7x - 3$	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 $6x^2 + 7x - 3$
	(b)		$49x^2$	2	M1 for $(7x)^2$ or $49x^n$ where $n \neq 2$ or ax^2 where $a \neq 49$ A1 cao
	(c)		$8y^3$	2	M1 for $4^{\frac{3}{2}}$ (= 8) or $y^{\frac{2\times3}{2}}$ (= y^3) or $(2y)^3$oe or $(64y^6)^{\frac{1}{2}}$ oe A1 cao

Jan 2022 - Question 1

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 $\frac{2x}{(x+2)^2}$

June 2022 - Question 1

1	(a)		$2y^2 + 3y - 9$	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, eg $2y^2 + 6y - 3y - 9$ A1 for $2y^2 + 3y - 9$
	(b)		$4 + 20x + 25x^2$	2	M1 for 3 terms out of 4 correct A1 for $4 + 20x + 25x^2$
	(c)		$2r^4$	2	M1 for $8^{\frac{1}{3}}$ (= 2) or $r^{\frac{12}{3}}$ (= r^4) A1 cao
	(d)		$t^{-\frac{11}{4}}$	1	B1 $t^{-\frac{11}{4}}$ (accept $\frac{1}{t^{\frac{11}{4}}}$ or $\left(\frac{1}{t}\right)^{\frac{11}{4}}$)

Jan 2023 - Question 1

1	(a)		$3t^4$	1	B1 cao
	(b)		1	2	M1 for y^{2-2} oe A1 cao
	(c)		x^5	1	B1 cao
	(d)		$4f^2 - 16f + 16$	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 $4f^2 - 16f + 16$

June 2023 - Question 8

8	(a)		2, 5, 6	2	M1 for correct expansion of brackets, eg $\frac{10}{5}x^0 + \frac{10}{2}x^6$ or $2 + 5x^6$ or for 1 term out of 2 terms correct, either 2 or $5x^6$ A1 cao
	(b)		$40t^4$	3	M1 for $\left(2t^{\frac{2}{3}}\right)^3 = 8t^2$ or $(125t^6)^{\frac{1}{3}} = 5t^2$ or for ct^4, $c \neq 40$ or for $40t^n$, $n \neq 4$ M1 for $\left(2t^{\frac{2}{3}}\right)^3 = 8t^2$ and $(125t^6)^{\frac{1}{3}} = 5t^2$ A1 cao

Jan 2024 – Question 1

1	(a)		$3x^2 + 4x - 4$	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 $3x^2 + 4x - 4$
	(b)		$4y^2 + 20y + 25$	2	M1 for 3 terms out of 4 correct A1 for $4y^2 + 20y + 25$
	(c)		$6t^4$	2	M1 for 6 or $t^{\frac{8}{2}}$ $(= t^4)$ A1 cao
	(d)		$r^{-\frac{13}{4}}$	1	B1 for $r^{-\frac{13}{4}}$ oe