Syrdiau

1.

(a) Mynegwch $\sqrt{75}$ ar y ffurf $a\sqrt{b}$, lle mae a a b yn rhifau cyfan. [2]

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2.

(c) Symleiddiwch $\sqrt{288}$.
Ysgrifennwch eich ateb ar ffurf syrdiau. [2]

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3.

(a) Enrhifwch $\dfrac{\sqrt{5}\times\sqrt{3}\times\sqrt{3}}{\sqrt{5}}$.

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[2]

4.

(c) O wybod bod $a = \sqrt{5}$, $b = \sqrt{7}$ ac $c = \sqrt{70}$, darganfyddwch werth abc.

Ysgrifennwch eich ateb ar y ffurf $n\sqrt{2}$ lle mae n yn rhif cyfan. [2]

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5.

(c) O wybod bod $f = \sqrt{2}$, $g = \sqrt{5}$ ac $h = \sqrt{10}$, darganfyddwch, ar ei ffurf symlaf,

(i) $\frac{fg}{h}$,

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[1]

(ii) $fg + h$,

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[1]

(iii) fh.

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[1]

6.

(c) Symleiddiwch $\sqrt{3}(5 + \sqrt{3}) - \sqrt{3}(5 - 2\sqrt{3})$. [2]

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7.

(a) Enrhifwch $\frac{8\times\sqrt{5}\times\sqrt{3}\times\sqrt{3}}{2\times\sqrt{5}}$. [2]

(b) Enrhifwch $\frac{25^{\frac{1}{2}}\times 18}{\sqrt{9^2}}$. [3]

8.

Enrhifwch $\left(\sqrt{50}-3\sqrt{2}\right)^2$. [3]

9.

(c) Symleiddiwch $\left(5-3\sqrt{2}\right)\left(5+3\sqrt{2}\right)$. [2]

10.

(c) Enrhifwch $\frac{(7-\sqrt{3})(7+\sqrt{3})}{2}$.

Nodwch yn glir a yw eich ateb yn gymarebol neu yn anghymarebol. [2]

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11.

(c) Symleiddiwch $(3-\sqrt{5})^2$. [2]

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12.

(b) Symleiddiwch $(7-5\sqrt{2})^2$ a nodwch a yw eich ateb yn gymarebol neu'n anghymarebol. [3]

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13.

Symleiddiwch

$$\frac{\left(5\sqrt{3}\right)^2 - \frac{2\sqrt{18}}{\sqrt{2}}}{\sqrt{32}\times\sqrt{2}}$$

a nodwch a yw eich ateb yn gymarebol neu'n anghymarebol. [5]

14.

(c) Enrhifwch $(\sqrt{3})^6$.

[1]

(ch) Symleiddiwch $(2 + 3\sqrt{2})(5 - \sqrt{2})$.

[3]

15.

(a) Enrhifwch $6\sqrt{5} \times 2\sqrt{5}$.

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[2]

(b) Enrhifwch $\left(7\sqrt{2} - 4\sqrt{2}\right)^4$.

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[3]

16.

(b) Symleiddiwch $\left(\pi\sqrt{20} - \pi\sqrt{5}\right)^2$, gan adael eich ateb yn nhermau π.

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[3]

Cynllun Marcio

1.

Methods in Mathematics June 2015 Unit 1 Higher Tier	Mark	Comment
15.(a) $5\sqrt{3}$ or accept a = 5 with b = 3	B2	B1 for sight of 3×25 or $3\times5\times5$ Do not accept $3\sqrt{25}$, etc
(b) 2.4×10^{29}	B2	B1 for numerator 9.6×10^{23}, or for their numerator correctly divided by 4×10^{-6} provided equivalent difficulty
	4	

2.

Linear GCSE Mathematics Higher Tier November 2015 Paper 1		FINAL MARK SCHEME Comments
15(a) 1	B1	
(b) ¼	B2	B1 for sight of $1/2^2$ or 4^{-1} or $1/_3\sqrt{64}$ or $1/64^{⅓}$ or 2^{-2} or $1/(_3\sqrt{8})^2$
(c) $12\sqrt{2}$	B2	Mark final answer B1 for sight of 288 broken down into factors e.g. 2×144, or $288\div2 = 144$, or $12\times12\times2$, or 4×72, or $288\div4 = 72$, or 2×12^2, or $2^2\times72$, or $2^3\times6^2$
	5	

3.

10.(a) 3	B2	B1 for one appropriate step, e.g. cancelling $\sqrt{5}/\sqrt{5}$, or sight of $\sqrt{9}$. Do not accept $\sqrt{45}/\sqrt{5}$ until simplified.
(b) ½ or 0.5 (with no working or from correct working)	B3	B2 for 1/8 AND 4 respectively OR 2^{-1} OR 4/8 B1 for 1/8 OR 4 respectively OR $2^{-3}\times(2^4)^{1/2}$
(c) 8.5×10^{-4}	B1	
(d) 3×10^9	B2	B1 for 3 000 000 000 or sight of 10^9
	8	

4.

16(a)(i) 0.021	B1	
16(a)(ii) 0.05	B2	B1 for 1/20
16(b) $0.\dot{1}\dot{2}$	B2	Accept 0.1212… . or dots as for recurring notation Otherwise B1 for 0.12(1…)
16(c) $35\sqrt{2}$	B2	B1 for $\sqrt{70} = \sqrt{2}\times\sqrt{35}$ seen or implied, OR $7\sqrt{5}\sqrt{10}$ or $5\sqrt{7}\sqrt{14}$

5.

15(a) 10x = 4.3535... **and** 1000x = 435.3535... with an attempt to subtract	M1	Or x = 0.43535… **and** 100x = 43.535… with an attempt to subtract, or equivalent. Or alternative method
431/990 ISW	A1	An answer of 43.1/99 gains M1 only
15(b) 1/10	B1	Do not accept 0.1
15(c)(i) 1	B1	CAO
15(c)(ii) $2\sqrt{10}$	B1	CAO
15(c)(iii) $2\sqrt{5}$	B1	CAO

6.

14. (a) $x = 0{\cdot}36666.....$ $10x = 3{\cdot}6666.....$ with an attempt to subtract 33/90 (=11/30) or 363/990 or equivalent		M1 A1	Or $10x$ and $100x$, or equivalent. Or an alternative method. CAO (3·3/9 gets M1 A0)
(b) 2/3		B2	B1 for $(3/2)^{-1}$ or $1/(3/2)$ or $1/1{\cdot}5$ or $(8/27)^{1/3}$ or $({}_3\sqrt{8}\,/{}_3\sqrt{27})$ or ${}_3\sqrt{(8/27)}$ B0 for $8/27^{1/3}$ or $8^{1/3}/27$
(c) $5\sqrt{3} + 3 - 5\sqrt{3} + 2\times3$ $= 9$		B1 B1	 FT from one incorrect term

7.

(a) 12	B2	B1 for one **appropriate** step, e.g. cancelling $\sqrt{5}/\sqrt{5}$, or sight of $\sqrt{9}$ or 3, not $(\sqrt{3})^2$ Do not accept $4\sqrt{45}/\sqrt{5}$ until simplified
(b) 10 (with no working or from correct working)	B3	B2 for 5 AND …/9 respectively B1 for 5 OR …/9 respectively For B2or B1 the 5, …/9 may be in working, rather than expressed as a quotient
(c) 6×10^{-5}	B1	
(d) 3×10^{12}	B2	B1 for 3 000 000 000 000 or sight of … $\times 10^{12}$
(e) $\frac{17\pi}{4}$ or $4\frac{1}{4}\pi$ or 4.25π	B2	Mark final answer B1 for $\frac{10\pi}{4} + \frac{7\pi}{4}$ or $2.5\pi + 1.75\pi$ or equivalent
	10	

8.

$(\sqrt{(2\times25)} - 3\sqrt{2})^2$ or $(\sqrt{(2\times5\times5)} - 3\sqrt{2})^2$ or sight of $\sqrt{50} = 5\sqrt{2}$ in working	M1	OR M1 $50 - 3\sqrt{50}\sqrt{2} - 3\sqrt{50}\sqrt{2} + 18$ any 3 terms correct (accept as terms given in table)
$(5\sqrt{2} - 3\sqrt{2})^2$ $(= (2\sqrt{2})^2)$	m1	m1 $50 - 30 - 30 + 18$ any 3 terms correct or $50 - 60 + 18$ with -60 correct and 1 other term (accept as terms given in table)
8	A1	CAO A1 8

9.

14. (a) $x = 0{\cdot}2747474.....$ $100x = 27{\cdot}47474.....$ with an attempt to subtract 272/990 or 136/495	M1 A1	Or $10x$ and $1000x$, or equivalent. Or an alternative method. An answer of 27·2/99 gains M1 only. Mark final answer. Do not ignore incorrect cancelling.
(b) (i) 1 (ii) 1/9 or 0·111…	B1 B2	 B1 for 9^{-1} or $1/3^2$ or $1/{}_3\sqrt{729}$or $1/729^{1/3}$ or $(1/729)^{1/3}$ or ${}_3\sqrt{(1/729)}$ Mark final answer.
(c) $25 + 15\sqrt{2} - 15\sqrt{2} - 18$ or equivalent $= 7$	M1 A1	 Do not ignore subsequent working. If no marks awarded, SC1 for 3 of the 4 terms correct.
	7	NB $25 + \sqrt{30} - \sqrt{30} - 18 = 7$ counts as 2 errors and gets 0 marks.

10.

Unit 2 GCSE Maths November 2015 HigherTier	MARK	FINAL MARK SCHEME Comment
14.(a) $x = 0{\cdot}3818181.....$ and $100x = 38{\cdot}181818....$ with an attempt to subtract 378/990 or 21/55 or equivalent.	M1 A1	Or $10x$ and $1000x$, or equivalent. Or a complete alternative method. An answer of 37·8/99 gains M1 only. Mark final answer. Do not ignore incorrect cancelling.
(b) (±) 1/10 or (±) 0.1	B2	B1 for 10^{-1} or $1/_4\sqrt{10000}$ or $1/10000^{1/4}$ or $(1/10000)^{1/4}$
(c) $[49 + 7\sqrt{3} - 7\sqrt{3} - \sqrt{3}\sqrt{3}]$ (/2) or equivalent = 23 AND rational.	M1 A1 6	Mark final answer. FT from 1 incorrect term or from $[49 + a - a - 3]$ (/ 2) for SC1.

11.

(a) $x = 0{\cdot}04444.....$ $10x = 0{\cdot}4444.....$ with an attempt to subtract	M1	Or $10x$ and $100x$, or equivalent. Or an alternative method.
(1/3 +) 4/90 OR (1/3 +) 2/45	A1	An answer of 0·4/9 gains M1 only.
34/90 (= 17/45)	A1	FT 'their 4/90' provided equivalent difficulty. Mark final answer. Do not ignore incorrect cancelling. *Alternative solution* *$x = 0{\cdot}37777.....$* *B1* *$10x = 3{\cdot}7777.....$ with an attempt to subtract* *M1* *$x = 34 / 90 (= 17/45)$* *A1* If no marks awarded, SC1 for a final answer of 34/99 (resulting from using 0·343434……) OR SC1 for a final answer of 37/99 (resulting from using 0·373737……)
(b) 1/4 or 0·25	B2	B1 for 4^{-1} or $1/\sqrt{16}$ or $1/16^{1/2}$ or $(1/16)^{1/2}$ Allow ±1/4 or ±0·25 for B2 OR –1/4 or –0·25 for B1
(c) $9 - 3\sqrt{5} - 3\sqrt{5} + 5$ $14 - 6\sqrt{5}$	M1 A1 7	3 or 4 terms correct. Mark final answer.

12.

2015 Summer Linear Paper 1 Higher Tier		Comments
17(a) Attempt to subtract $10x = 3.4646..$ from $1000x = 346.46…$ or alternative method	M1	Or equivalent for $100x = 34.646..$ and $x = 0.34646..$
343/990	A1	Final answer of 34.3/99 M1 only
17(b) $49 - 35\sqrt{2} - 35\sqrt{2} + 50$	B1	
$= 99 - 70\sqrt{2}$	B1	FT correctly simplified (equivalent level of difficulty) provided at least 3 of the terms are correct OR $49 \pm a\sqrt{2} + 50$ with $a \neq 0$
Irrational	E1	Depends on 'their answer' including a surd and at least B1 previously awarded

13.

$(5\sqrt{3})^2 = 25 \times 3$ (= 75)	✓	B1	Am y tri marc cyntaf, derbyn lluoswm cywir o'r cyfanrifau ym mhob achos, e.e. 2 × 2 × 2 (=8).
$\frac{2\sqrt{18}}{\sqrt{2}} = 2 \times \sqrt{9}$ (= 2 × 3 = 6)	✓	B1	
$\sqrt{32} \times \sqrt{2} = \sqrt{64}$ (= 8)	✓	B1	
(Ateb =) 69/8 neu gywerth.	✓	B1	C.A.O. Rhaid i ateb cywerth fod wedi'i symleiddio. Felly B0 am (75 – 6) / 8. ISW.
Cymarebol	✓	B1	Dilyn trwodd 'eu hateb terfynol' os dyfarnwyd o leiaf 2 o'r 3 B1 cyntaf.

14.

13.(a) 0.25	B2	B1 for 2 correct steps, following through 1 error: reciprocal, cube root, square. B1 for an answer of 1/4
(b) 4(x – 20)(x + 20)	B3	B2 for (2x – 40)(2x + 40) or other correct partially factorised including a correct pair of brackets B1 for 4(x … 20)(x …20) or (2x … 40)(2x…40)
(c) 27	B1	
(d) 10 +15√2 - 2√2 - 6 = 4 + 13√2	B2 B1	B1 for any 3 of the 4 terms correct CAO. Mark final answer
	9	

15.

15.(a) 60 (b) 324	B2 B3	B1 for sight of $\sqrt{5}\times\sqrt{5} = 5$ B2 for $(3\sqrt{2})^4$ with an attempt to evaluate, 81× ..or ..×4, OR 18×18 B1 for $(3\sqrt{2})^4$ OR multiply pair brackets to 18
	5	

16.

8.(a)10x =7.5252.. and 1000x= 752.52…with attempt to subtract 745/990 (ISW)	M1 A1	Or equivalent Watch for slips in the denominator! A final answer of 74.5/99 is M1, A0
8.(b) $\pi^2(\sqrt{(4\times5)} - \sqrt{5})^2$ OR $20\pi^2 - 2\pi^2\sqrt{20}\sqrt{5} + 5\pi^2$ $\pi^2(\sqrt{5})^2$ middle term (±) $20\pi^2$ $5\pi^2$	M1 M1 A1	If error is not considering π^2 correctly, leading to answers of 5 π or 5, then award SC1
8.(c)1/20^3or 20^{-3} or 8000^{-1} or 1/√64 000 000 or 1/ 64 000 $000^{1/2}$ 1/8000 (ISW)	M1 A1	