

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 $\frac{\sqrt{5} \times \sqrt{3} \times \sqrt{3}}{\sqrt{5}}$.

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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]

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

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8.

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

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9.

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

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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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15.

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

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[2]

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

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[3]

16.

(b) Symleiddiwch $(\pi\sqrt{20} - \pi\sqrt{5})^2$, 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 $3 \times 5 \times 5$ 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 (b) $\frac{1}{4}$	B1 B2	B1 for sight of $1/2^2$ or 4^{-1} or $1/3\sqrt{64}$ or $1/64^{1/4}$ or 2^{-2} or $1/(\sqrt[3]{8})^2$
(c) $12\sqrt{2}$	B2 5	Mark final answer B1 for sight of 288 broken down into factors e.g. 2×144 , or $288 \div 2 = 144$, or $12 \times 12 \times 2$, or 4×72 , or $288 \div 4 = 72$, or 2×12^2 , or $2^2 \times 72$, or $2^3 \times 6^2$

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) $\frac{1}{2}$ or 0.5 (with no working or from correct working)	B3	B2 for $1/8$ <u>AND</u> 4 respectively OR 2^{-1} OR $4/8$ B1 for $1/8$ <u>OR</u> 4 respectively OR $2^{-3} \times (2^4)^{1/2}$
(c) 8.5×10^{-4}	B1	
(d) 3×10^9	B2 8	B1 for 3 000 000 000 or sight of 10^9

4.

16(a)(i) 0.021	B1	
16(a)(ii) 0.05	B2	B1 for $1/20$
•• 16(b) 0.12	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) $10x = 4.3535\dots$ and $100x = 435.3535\dots$ with an attempt to subtract $431/990$ ISW	M1 A1	Or $x = 0.43535\dots$ and $100x = 43.535\dots$ with an attempt to subtract, or equivalent. Or alternative method 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) $x = 0.36666\dots$ $10x = 3.6666\dots$ 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 $1/1.5$ or $(8/27)^{1/3}$ or $(\sqrt[3]{8/\sqrt[3]{27}})$ or $\sqrt[3]{(8/27)}$ B0 for $8/27^{1/3}$ or $8^{1/3}/27$
(c) $5\sqrt{3} + 3 - 5\sqrt{3} + 2 \times 3 = 9$	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 <u>AND</u> .../9 respectively B1 for 5 <u>OR</u> .../9 respectively For B2 or 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 $\dots \times 10^{12}$
(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.

$(\sqrt{2 \times 25} - 3\sqrt{2})^2$ or $(\sqrt{2 \times 5 \times 5} - 3\sqrt{2})^2$ 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) $x = 0.2747474\dots$ $100x = 27.47474\dots$ with an attempt to subtract $272/990$ or $136/495$	M1 A1	Or $10x$ and $100x$, 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 $0.111\dots$	B1 B2	B1 for 9^{-1} or $1/3^2$ or $1/3\sqrt[3]{729}$ or $1/729^{1/3}$ or $(1/729)^{1/3}$ or $\sqrt[3]{(1/729)}$ Mark final answer.
(c) $25 + 15\sqrt{2} - 15\sqrt{2} - 18$ or equivalent $= 7$	M1 A1 7	Do not ignore subsequent working. If no marks awarded, SC1 for 3 of the 4 terms correct. NB $25 + \sqrt{30} - \sqrt{30} - 18 = 7$ counts as 2 errors and gets 0 marks.

10.

Unit 2 GCSE Maths November 2015 Higher Tier	M A R K	FINAL MARK SCHEME Comment
14.(a) $x = 0.3818181\dots$ and $100x = 38.181818\dots$ <u>with an attempt to subtract</u> $378/990$ or $21/55$ or equivalent.	M1 A1	Or $10x$ and $1000x$, or equivalent. Or a <u>complete alternative method</u> . An answer of $37.8/99$ gains M1 only. Mark final answer. Do not ignore incorrect cancelling.
(b) $(\pm) 1/10$ or $(\pm) 0.1$	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	Mark final answer. FT from 1 incorrect term or from $[49 + a - a - 3] / 2$ for SC1.
	6	

11.

(a) $x = 0.04444\dots$ $10x = 0.4444\dots$ <u>with an attempt to subtract</u> $(1/3 +) 4/90$ OR $(1/3 +) 2/45$ $34/90 (= 17/45)$	M1 A1 A1	Or $10x$ and $100x$, or equivalent. Or an alternative method. An answer of $0.4/9$ gains M1 only. FT 'their $4/90$ ' provided equivalent difficulty. Mark final answer. Do not ignore incorrect cancelling. <i>Alternative solution</i> $x = 0.37777\dots$ B1 $10x = 3.7777\dots$ <u>with an attempt to subtract</u> M1 $x = 34 / 90 (= 17/45)$ A1 If no marks awarded, SC1 for a final answer of $34/99$ (resulting from using $0.343434\dots$) OR SC1 for a final answer of $37/99$ (resulting from using $0.373737\dots$)
(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 $\pm 1/4$ 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 $10x = 3.4646\dots$ from $1000x = 346.46\dots$ or alternative method $343/990$	M1 A1	Or equivalent for $100x = 34.646\dots$ and $x = 0.34646\dots$ Final answer of $34.3/99$ M1 only
17(b) $49 - 35\sqrt{2} - 35\sqrt{2} + 50$ $= 99 - 70\sqrt{2}$ Irrational	B1 B1 E1	FT correctly simplified (equivalent level of difficulty) provided at least 3 of the terms are correct OR $49 \pm a\sqrt{2} + 50$ with $a \neq 0$ 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. $2 \times 2 \times 2 (=8)$.
$\frac{2\sqrt{18}}{\sqrt{2}} = 2 \times \sqrt{9} (= 2 \times 3 = 6)$	✓	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 B2 for $(2x - 40)(2x + 40)$ or other correct partially factorised including a correct pair of brackets B1 for $4(x \dots 20)(x \dots 20)$ or $(2x \dots 40)(2x \dots 40)$
(b) $4(x - 20)(x + 20)$	B3	
(c) 27	B1	B1 for any 3 of the 4 terms correct CAO. Mark final answer
(d) $10 + 15\sqrt{2} - 2\sqrt{2} - 6$	B2	
$= 4 + 13\sqrt{2}$	B1	
	9	

15.

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

16.

8.(a) $10x = 7.5252\dots$ and $1000x = 752.52\dots$ 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) $\frac{\pi^2(\sqrt{4 \times 5} - \sqrt{5})^2}{\pi^2(\sqrt{5})^2}$ OR $20\pi^2 - 2\pi^2\sqrt{20\sqrt{5}} + 5\pi^2$ $5\pi^2$ middle term (\pm) $20\pi^2$	M1 M1 A1	If error is not considering π^2 correctly, leading to answers of 5π or 5 , then award SC1
8.(c) $1/20^3$ or 20^{-3} or 8000^{-1} or $1/\sqrt{64\,000\,000}$ or $1/64\,000\,000^{1/2}$ $1/8000$ (ISW)	M1 A1	