

Ffactorio Mynegiadau Cwadratig

1.

Ffactoriwch y mynegiad $x^2 + 11x + 24$, a thrwy hynny datrysych yr hafaliad $x^2 + 11x + 24 = 0$. [3]

2.

(a) Ffactoriwch a thrwy hynny datrysych $x^2 - 4x - 12 = 0$. [3]

3.

(b) Ffactoriwch $x^2 - 5x - 14$ a thrwy hynny datrysych $x^2 - 5x - 14 = 0$. [3]

4.

- (a) Ffactoriwch y mynegiad $x^2 + 14x - 15$ a thrwy hynny datrysych yr hafaliad $x^2 + 14x - 15 = 0$.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

5.

- (a) Ffactoriwch $x^2 - 2x - 24$, a thrwy hynny datrysych $x^2 - 2x - 24 = 0$. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

6.

- (c) Ffactoriwch y mynegiad $x^2 + 5x - 24$ a thrwy hynny datrysych yr hafaliad $x^2 + 5x - 24 = 0$. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

16.

Cyfaint ciwboid yw 912cm^3 a dimensiynau'r ciwboid yw 4cm , $(x + 2)\text{cm}$ a $(x + 9)\text{cm}$.

Ysgrifennwch hafaliad yn nhermau x .

Trwy hynny, datryswch yr hafaliad i ddarganfod dimensiynau'r ciwboid.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

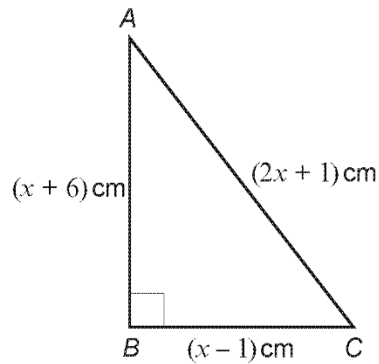
.....

.....

[7]

18.

Mae triongl ongl sgwâr yn cael ei ddangos isod.



Nid yw'r diagram wedi'i luniadu wrth raddfa

- (a) Dangoswch fod $x^2 - 3x - 18 = 0$. [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Ffactoriwch y mynegiad $x^2 - 3x - 18$, a thrwy hynny datrysych yr hafaliad $x^2 - 3x - 18 = 0$.
Ysgrifennwch hydoedd ochrau'r triongl ongl sgwâr. [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

$AB =$ cm $AC =$ cm $BC =$ cm

Cynllun Marcio

1.

Unitised Unit 3 – June 2015 Higher Tier	✓		Comments
11. $(x+8)(x+3)$ $x=-8$ AND $x=-3$		B2 B1	B1 for $(x...8)(x...3)$ Strict FT their brackets provided previous B1 awarded. Final B0 for solutions obtained using the formula.

2.

10(a) $(x-6)(x+2)$ $x=6$ AND $x=-2$	B2 B1	B1 for $(x+6)(x-2)$ OR $(x-6)(x-2)$ STRICTLY FT their pair of brackets
--	----------	--

3.

(b) $(x+2)(x-7) (=0)$ $x=-2$ and $x=7$	B2 B1 6	B1 for $(x...2)(x...7)$ Must be from factorised expression or equation FT from their pair of brackets
---	---------------	---

4.

13.(a) $(x+15)(x-1)$ -15 and 1	B2 B1	B1 for $(x...15)(x...1)$ or split mid term and 1st step factor FT from a pair of brackets
---------------------------------------	----------	--

5.

(a) $(x-6)(x+4)$ $(x=)6$ AC $(x=)-4$	B2 B1	B1 am $(x...6)(x...4)$. Dilyn trwodd yn llym o'u <u>cromfachau</u> nhw. Caniatáu'r canlynol. B2 am $x-6 (=0)$ AC $x+4 (=0)$ (B1) $(x=)6$ AC $(x=)-4$ (B1) B1 am $x+6 (=0)$ AC $x-4 (=0)$ (B0) $(x=)-6$ AC $(x=)4$ (B1) Dilyn trwodd B1 os gwelir $(x=)6$ AC $(x=)-4$ yn unig (B1)
---	----------	--

6.

(c) $(x+8)(x-3)$ -8 and 3	B2 B1 7	B1 for $(x..8)(x...3)$ or split mid-term and 1 st step to factorise STRICT FT from their pair of brackets with similar difficulty
--------------------------------------	---------------	---

7.

$$(2x + 3)(x - 1) \quad \text{M2}$$

$$(2x + 3)(x - 1) = 0$$

Naill ai $x = -\frac{3}{2}$ neu $x = 1$ A1

8.

8.(a) $(2x + 5)(3x - 5)$	B2	B1 for $(2x \dots 5)(3x \dots 5)$
--------------------------	----	-----------------------------------

9.

Unitised Unit 3 – Nov 2015 Higher Tier		FINAL MARK SCHEME Comments
15. (a) $(3x - 7)(2x + 3)$ $x = 2\frac{1}{3}$ AND $x = -1\frac{1}{2}$ or equivalents	B2 B1	B1 for $(3x \dots 7)(2x \dots 3)$ FT from B1. Allow 2:33(...) but not 2:3 for $2\frac{1}{3}$. Mark final answer.

10.

$(6x + 1)(2x - 3)$ $x = -1/6$ AND $x = 3/2$ or equivalent	B2 B1 3	B1 for $(6x \dots 1)(2x \dots 3)$ Strict FT from their brackets
--	---------------	--

11.

15(a) $(2x + 5)(4x - 1)$ $x = -5/2$ AND $x = 1/4$	B2 B1	B1 for $(2x \dots 5)(4x \dots 1)$ FT from their pair of brackets, equivalent difficulty <i>No marks for the use of the quadratic formula, or trial & improvement</i>
--	----------	--

12.

7(c) $(3x + 2)(5x + 7)$	B2	Mark final answer. B1 for $(3x + 7)(5x + 2)$ or $(3x \dots 2)(5x \dots 7)$ or $5x(3x + 2) + 7(3x + 2)$ or equivalent
-------------------------	----	---

13.

(c) $(x + 7)(x - 7)$	B1	ISW
----------------------	----	-----

14.

(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 $4(x \dots 20)(x \dots 20)$ or $(2x \dots 40)(2x \dots 40)$
-------------------------	----	--

15.

(a) $2x^2 + x + 1 = 7$ NEU $x^2 + x^2 + x + 1 = 7$ yn arwain at $2x^2 + x - 6 = 0$		B1	Rhaid ei weld. Derbyn $1(x+1)$ ar gyfer $x + 1$.
(b) $(2x - 3)(x + 2) (=0)$ (Hyd pob ochr \Rightarrow) 1.5 (metr)	✓✓ ✓	B2 B1	B1 am $(2x \dots 3)(x \dots 2)$ Dilyn trwodd o 'eu dwy set nhw o gromfachau'. (Os yw'r ddau ddatrysiad sy'n dod o'r dilyn trwodd â'r un arwydd, yna mae angen y ddau ar gyfer y B1 hwn.) Anwybyddu presenoldeb $x = -2$. <u>Gan ddefnyddio'r fformiwla gwadratiq.</u> $(x \Rightarrow) \frac{-1 \pm \sqrt{1^2 - 4(2)(-6)}}{2(2)}$ M1 <i>Caniatáu un gwall, o ran arwydd neu amnewid, ond nid yn y fformiwla.</i> $= \frac{-1 \pm \sqrt{49}}{4}$ A1 $x = 1.5$ (metr) [anwybyddu $x = -2$] A1 <u>Gan ddefnyddio cynniq a gwella</u> <i>Dyfarnu B3 am ddull sy'n arwain at y ddau ddatrysiad, sef $x = 1.5$ ac $x = -2$, neu fel arall B0.</i>
Gosodiad am anwybyddu $x = -2$ gan y byddai'n hyd negatif.	✓	E1	Dilyn trwodd os yw un datrysiad yn bositif a'r llall yn negatif.

16.

10. $4(x+2)(x+9) = 912$ $(x+2)(x+9) = 912/4$ OR $4(x^2 + 2x + 9x + 18) = 912$ $x^2 + 2x + 9x + 18 (= 228)$ OR $4x^2 + 44x + 72 (= 912)$ $x^2 + 11x - 210 = 0$ OR $4x^2 + 44x - 840 = 0$ $(x + 21)(x - 10) = 0$ OR $4(x + 21)(x - 10) = 0$ $x = 10$ Dimensions (4cm) 12(cm) and 19(cm) only	B1 M1 M1 M1 A1 A1 A1	Right hand side may be inserted at a later stage FT until 2 nd error FT equivalent level FT equivalent level. For the expression FT equivalent level Or factorised without the factor of 4 extracted, or equivalent Ignore negative value for x FT provided at least 2 M marks awarded No negative dimensions included <i>For candidates trying to find, from their equation, 2 numbers with a difference of 7 that give a product of 228, allow full credit for $12 \times 19 (\times 4)$</i> <i>Trial and improvement methods from the start, or answers only, are awarded no marks</i>
--	--	---

17.

(a) $\frac{1}{2} \times (a + a + 4) \times (a - 5)$ $\frac{1}{2} \times (2a^2 + 4a - 10a - 20)$ $a^2 - 3a - 10$	M1 m2 A1	Accept 'invisible' brackets if intention is shown in later working m1 for any 3 of the 4 terms shown within the brackets given correctly <i>Alternative for m2 is $\frac{2(a+2)(a-5)}{2}$ or award m1 if 1 slip made in factorising $2a + 4$, i.e. $2(a \pm \dots)$ or $2(\dots a + 2)$</i>
(b) $a^2 - 3a - 10 = 30$ $a^2 - 3a - 40 = 0$ $(a - 8)(a + 5) (=0)$ $a = 8$ (cm) Height 3 (cm) with no other solutions	M1 m1 m1 A1 B1 9	Convincing FT from correct working only Must be shown ' $=0$ ' For factorising or for quadratic formula used correctly with $b^2 - 4ac$ simplified Ignore $a = -5$ (cm) also included for A1 only FT 'their 8' - 5 correctly evaluated provided at least M1 and m1 awarded

18.

<p>(a) To be viewed with diagram. Ribbon marked. Correct statement of Pythagoras' theorem. e.g. $(2x+1)^2 = (x+6)^2 + (x-1)^2$ Sight of one correct expansion $4x^2+4x+1$ OR $x^2+12x+36$ OR x^2-2x+1 $4x^2+4x+1 = (x^2+12x+36) + (x^2-2x+1)$ $2x^2-6x-36=0$ leading to $x^2-3x-18=0$</p>	<p>✓ ✓ ✓ ✓</p>	<p>M1 B1 A1 A1</p>	
<p>(b) $(x-6)(x+3)$ $x=6$ (AND $x=-3$) AB = 12, AC = 13, BC = 5</p>	<p>✓ ✓ ✓ ✓</p>	<p>B2 B1 B1</p>	<p>B1 for $(x...6)(x...3)$. FT from B1. CAO.</p>

19.

<p>(b) $(3x+5)(3x-5)$ $2(3x+5)$ $(3x-5)/2$</p>	<p>B2 B1 B1</p>	<p>B1 for $(3x...5)(3x...5)$ including being written as either $(3x-5)^2$ or $(3x+5)^2$ FT provided no more than 1 previous error and provided simplification required. Mark final answer. Accept $1.5x - 2.5$ Award B4 for sight of a correct answer</p>
--	-------------------------	--

20.

<p>18.(a) $(x+9)(x-9)$ $(2x-5)(x+9)$ $\frac{x-9}{2x-5}$</p>	<p>B1 B2 B1</p>	<p>B1 for $(2x...5)(x...9)$ FT if possible for similar level of difficulty Mark final answer, do not ISW</p>
--	-------------------------	---

21.

<p>14(b) $(7x+10)(7x-10)$ $2(7x+10)$ $(7x-10)/2$</p>	<p>B2 B1 B1</p>	<p>B1 for $(7x...10)(7x...10)$ FT provided no more than 1 previous error and provided simplification required. Mark final answer. Accept $3.5x - 5$</p>
---	-------------------------	---

22.

<p>(a) $(x-7)(x-5)$</p>	<p>B2</p>	<p>B1 am $(x-7)(x-7+2)$ neu $(x-7)(x+k)$ gyda $k \neq 0$ NEU $(x...7)(x...5)$</p>
------------------------------------	-----------	--

23.

<p>12(b) $2(x+3)(x+1)$</p>	<p>B2</p>	<p>B1 for $2(x+3)(x+3-2)$ or $(2x+6)(x+1)$ or $(x+3)(2x+2)$ or $2(x^2+4x+3)$</p>
---------------------------------------	-----------	--