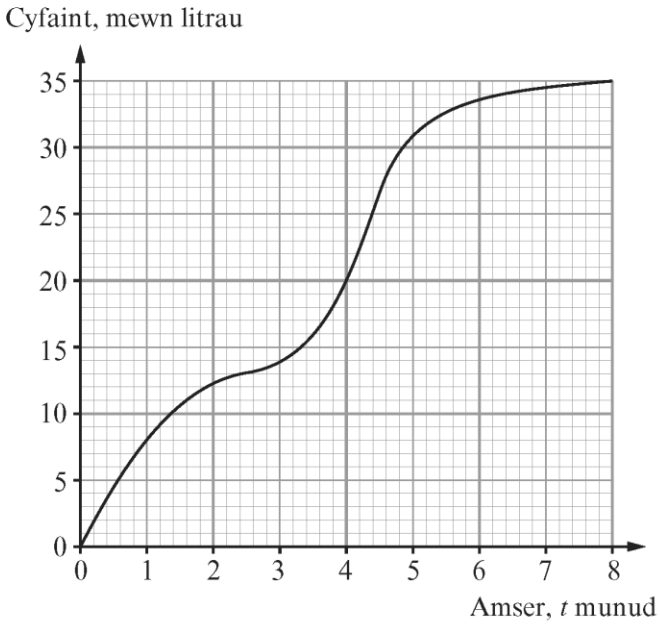
Cyn-Galcwlws

1.

Mae tanc wedi cael ei lenwi â dŵr.
Mae'r graff isod yn dangos cyfaint y dŵr yn y tanc dros gyfnod amser o 8 munud.



(a) Cyfrifwch raddiant y graff ar amser $t = 3$.
Rhaid i chi nodi unedau eich ateb.

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[4]

(b) Eglurwch beth mae graddiant y graff yn ei fesur.

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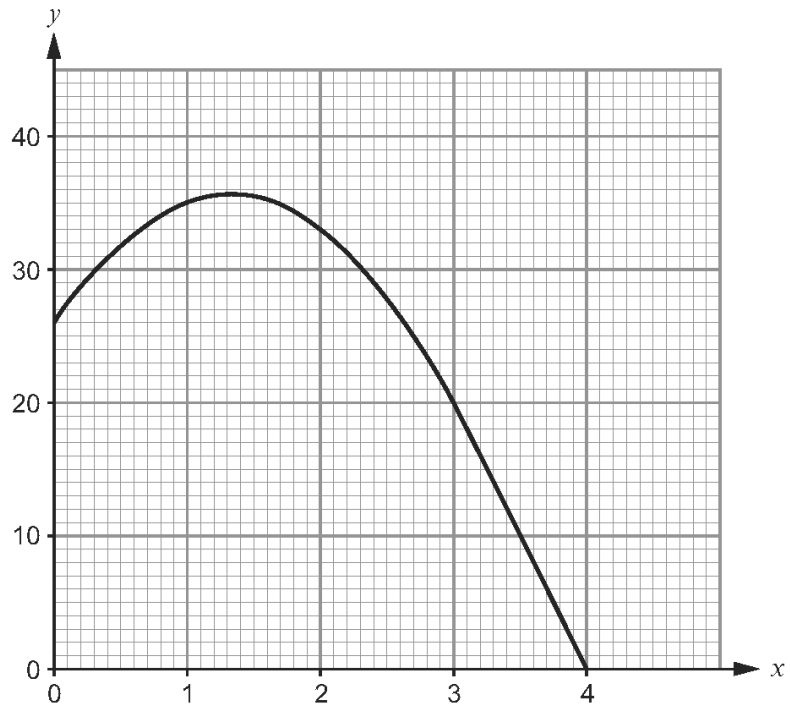
[1]

2.

Mae graff $y = f(x)$ rhwng $x = 0$ ac $x = 4$ yn cael ei ddangos isod.



(a) Amcangyfrifwch raddiant y gromlin yn $x = 2$. [3]

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(b) Defnyddiwch y rheol trapesiwm â'r mesurynnau $x = 0$, $x = 1$, $x = 2$, $x = 3$ ac $x = 4$ i amcangyfrif yr arwynebedd sydd â'r gromlin $y = f(x)$, yr echelin-x a'r echelin-y yn ffin iddo. [3]

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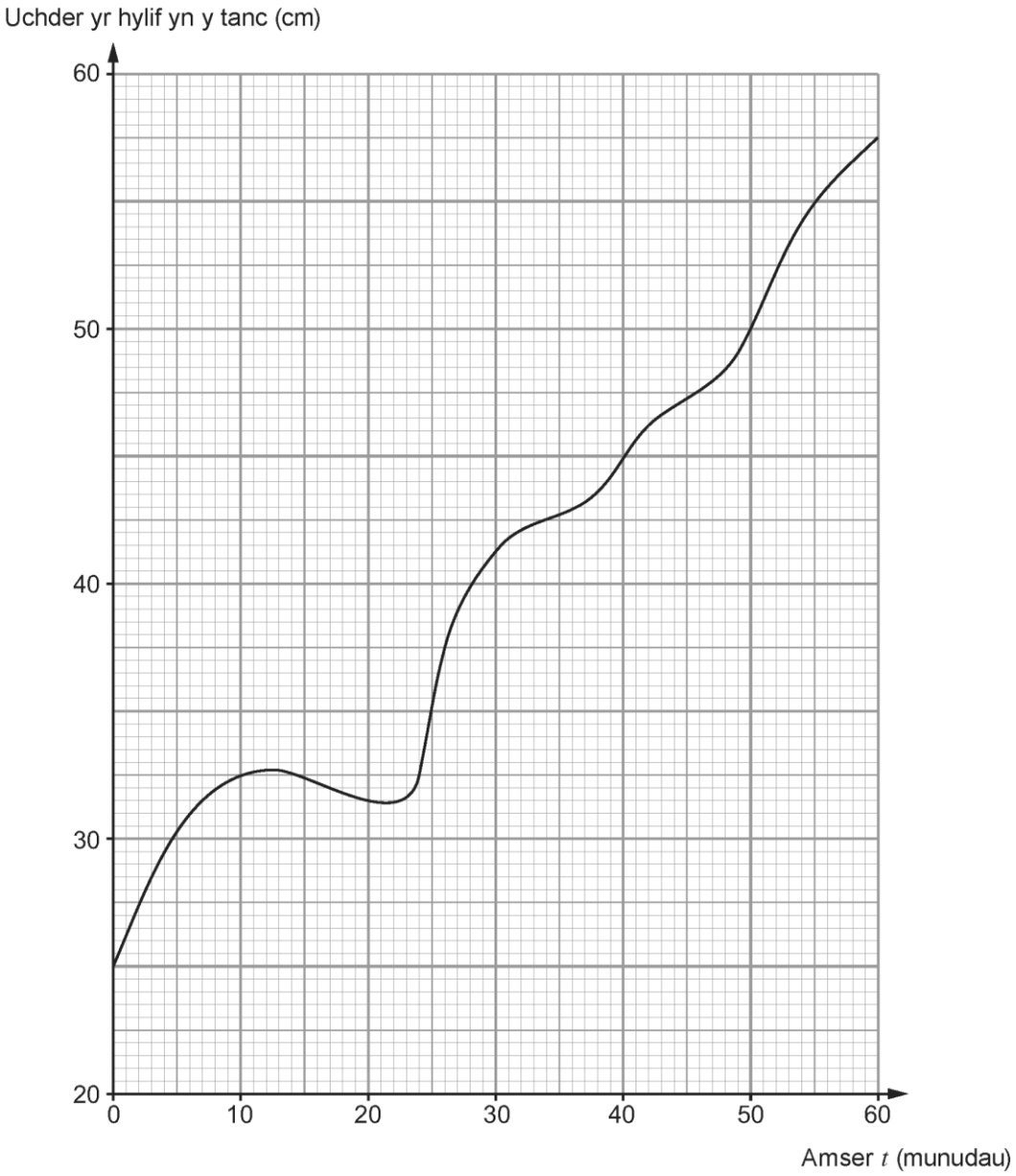
3.

Mae'r graff yn dangos uchder yr hylif mewn tanc yn ystod cyfnod un-awr.



(a) Yn ystod pa **gyfnod 5-munud** oedd uchder yr hylif yn cynyddu ar y gyfradd fwyaf? [1]

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(b) Cyfrifwch amcangyfrif ar gyfer cyfradd y cynnydd yn uchder yr hylif yn y tanc ar amser $t = 35$. Nodwch unedau eich ateb. [4]

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4.

Mae'r graff isod yn dangos buanedd beiciwr, rhwng dwy set o oleuadau traffig.

(a) Cyfrifwch gyflymiad *(acceleration)* y beiciwr ar $t = 7{\cdot}5$ eiliad.
Rhowch unedau eich ateb. [4]

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(b) Cyfrifwch amcangyfrif ar gyfer y pellter rhwng y ddwy set o oleuadau traffig. [4]

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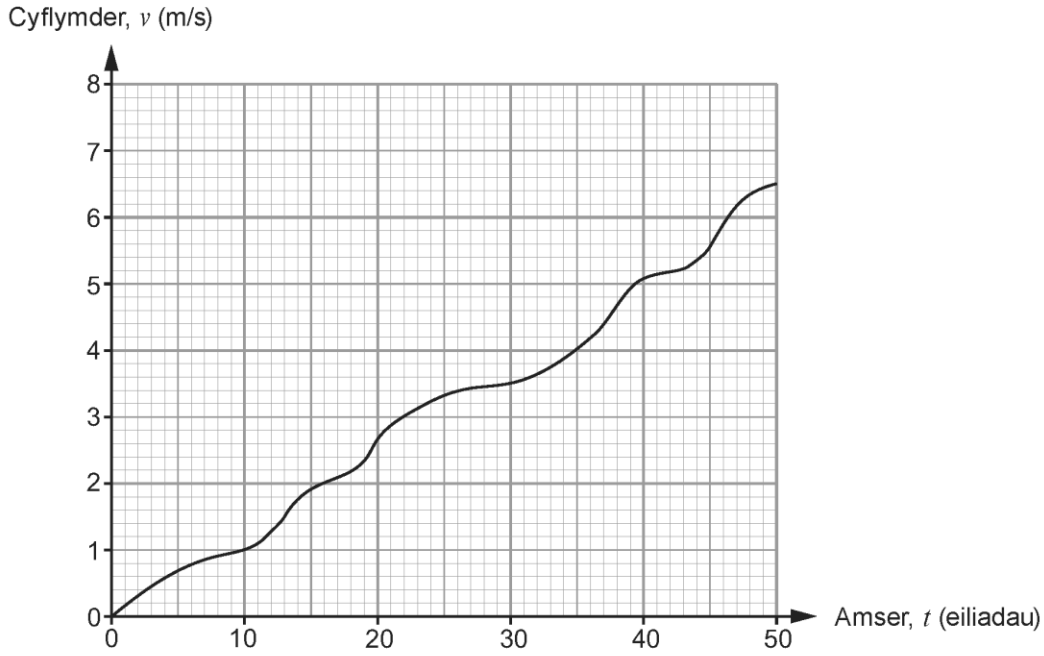
5.

Mae graff cyflymder-amser, sy'n cynrychioli taith 50-eiliad beic modur yn cyflymu o 0 m/s, i'w weld isod.



(a) Cyfrifwch amcangyfrif o'r pellter wedi'i deithio gan y beic modur yn y 40 eiliad cyntaf. [3]

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Amcangyfrif o'r pellter wedi'i deithio ..... metr

(b) Cyfrifwch amcangyfrif o'r cyflymiad *(acceleration)* ar amser t = 30 eiliad. [3]

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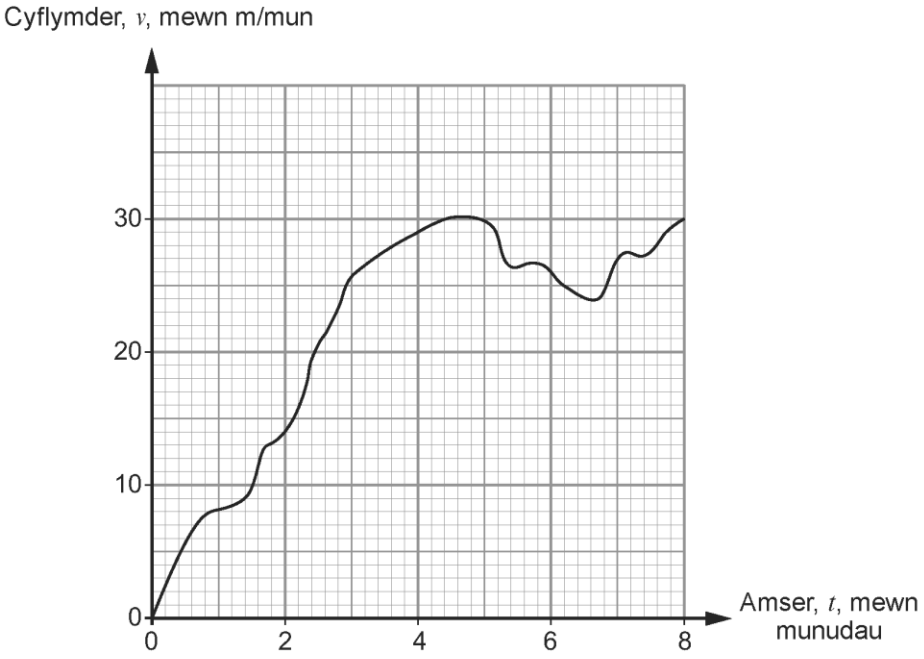
Amcangyfrif o'r cyflymiad ..... m/s^2

6.

Gwnaeth Polly gynnal arbrawf.
Defnyddiodd hi gyfarpar i gofnodi cyflymder *(velocity)* gwrthrych, v, mewn m/mun am 8 munud cyntaf yr arbrawf.

Mae'r graff cyflymder-amser yn cael ei ddangos isod.



(a) Ysgrifennwch raddiant y gromlin pan fo $t = 4{\cdot}6$. [1]

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(b) Darganfyddwch amcangyfrif ar gyfer cyflymiad *(acceleration)* y gwrthrych ar $t = 3{\cdot}5$. [3]

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(c) (i) Defnyddiwch y rheol trapesiwm, gyda'r mesurynnau $t = 0$, $t = 2$, $t = 4$, $t = 6$ a $t = 8$, i amcangyfrif arwynebedd y rhanbarth sydd â'r gromlin, yr echelin amser bositif a'r llinell $t = 8$ yn ffin iddo. [4]

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(ii) Cyfrifwch amcangyfrif ar gyfer y pellter deithiodd y gwrthrych yn 8 munud cyntaf arbrawf Polly, gan roi eich ateb mewn cilometrau. [1]

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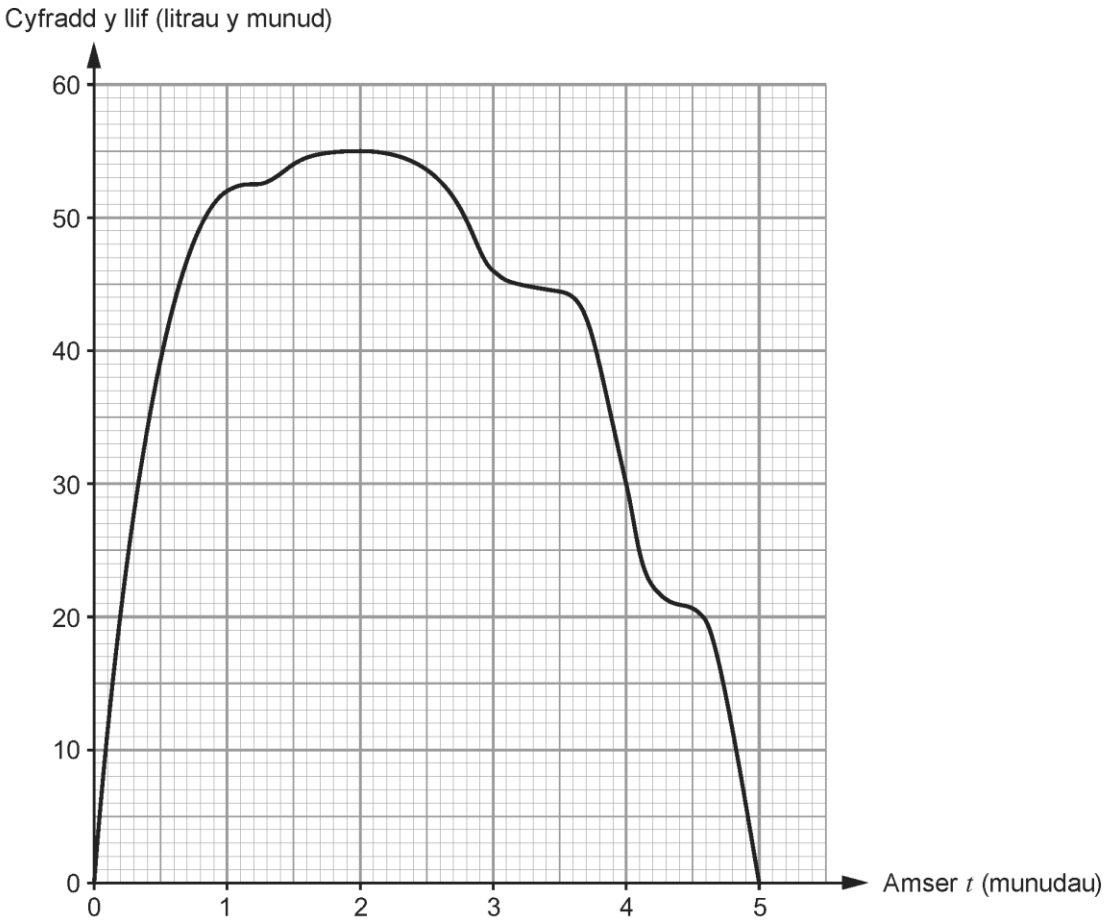
7.

Mae tanc gwag yn mynd i gael ei lenwi â dŵr.
Mae'r graff isod yn dangos cyfradd llif y dŵr trwy beipen yn ystod llenwi rheoledig y tanc.
Ar ôl 5 munud mae'r tanc yn llawn ac mae'r dŵr yn cael ei atal.



Gan ddefnyddio'r mesurynnau $t = 0$, $t = 1$, $t = 2$, $t = 3$, $t = 4$ a $t = 5$, amcangyfrifwch gyfaint y dŵr yn y tanc pan fo'n llawn. Nodwch unedau eich ateb. [4]

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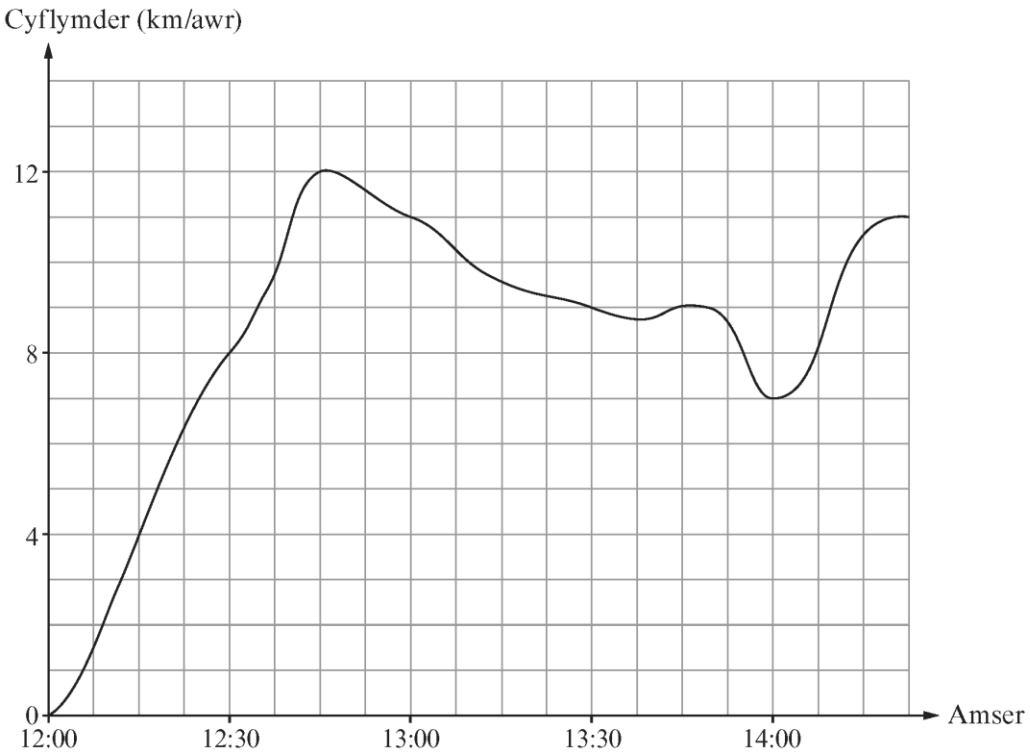
8.

Reidiodd Sue ei beic ar hyd llwybr beicio.
Dechreuodd hi ei thaith am 12:00.
Mae'r graff yn dangos gwybodaeth am ei thaith feicio.



Trwy ystyried pob $\frac{1}{2}$ awr o daith feicio Sue, defnyddiwch y rheol trapesiwm i gyfrifo amcangyfrif ar gyfer y pellter cyfan a gafodd ei deithio yn y 2 awr gyntaf.
Rhowch unedau eich ateb.

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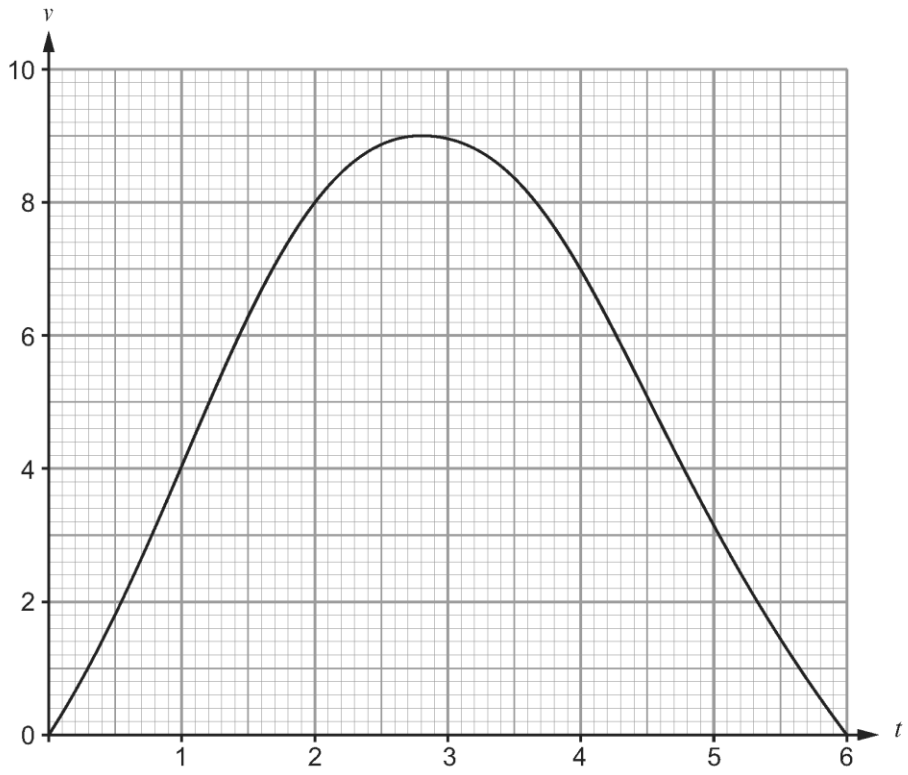
[5]

9.

Mae'r graff isod yn dangos y cyflymder, v, mewn m/s, ar gyfer gronyn *(particle)* ar amser t eiliad ar ôl dechrau'r arbrawf.

(a) Darganfyddwch frasamcan *(approximation)* ar gyfer y pellter sydd wedi'i deithio gan y gronyn yn ystod 6 eiliad yr arbrawf gan ddefnyddio'r mesurynnau $t = 0$, $t = 2$, $t = 4$, $t = 6$. [4]



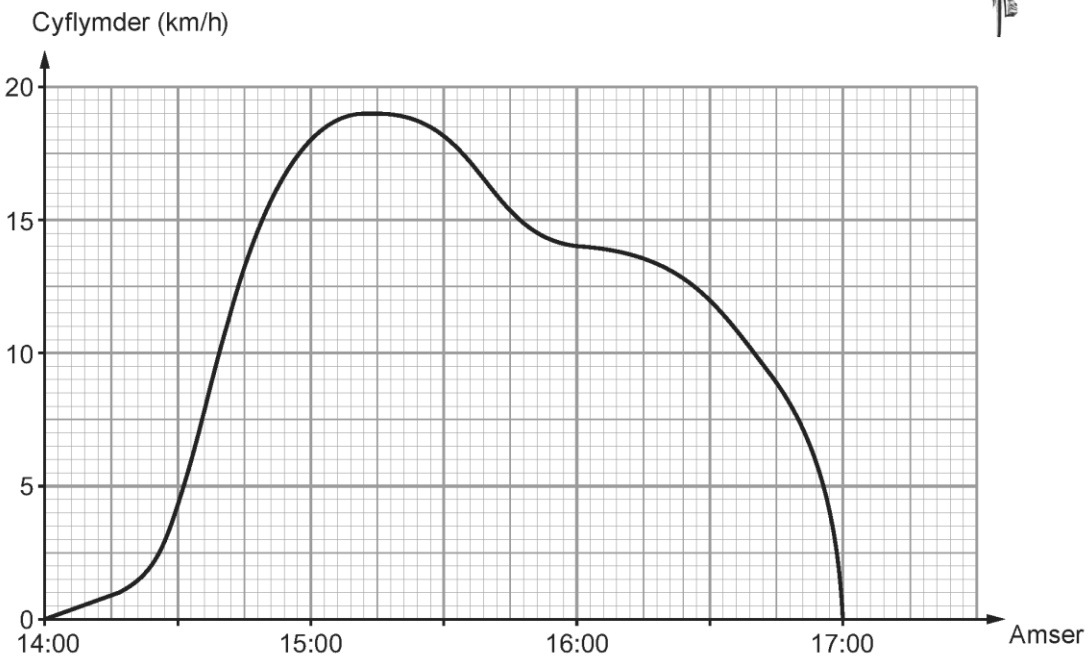
(b) Ydy eich brasamcan yn oramcangyfrif *(overestimate)* neu yn danamcangyfrif *(underestimate)* o'r pellter gwirioneddol sydd wedi'i deithio?
Ticiwch (✓) flwch.
Rhowch reswm dros eich ateb. [1]

Goramcangyfrif ☐ Tanamcangyfrif ☐

10.

Aeth Siân am daith ar ei beic.

Dechreuodd hi ei thaith am 14:00.
Mae'r graff isod yn dangos gwybodaeth am y daith ar ei beic.



(a) Yn ystod pa gyfnod o chwarter awr oedd cyflymiad *(acceleration)* mwyaf Siân? [1]

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(b) Tua faint o'r gloch gwnaeth Siân stopio cyflymu? [1]

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(c) Mae Siân fel arfer yn gallu beicio ar gyflymder o 18 km/awr yn gyfforddus iawn.
Mynegwch 18 km/awr mewn metrau yr eiliad. [2]

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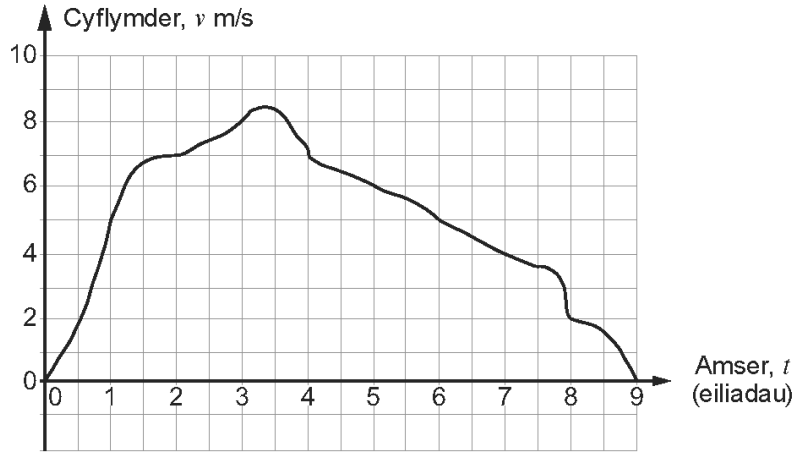
11.

Gwnaeth gwyddonydd gofnodi beth yw cyflymder, v m/s, gronyn *(particle)* o amser $t = 0$ i $t = 9$ eiliad.
Mae ei ganlyniadau'n cael eu dangos yn y graff isod.



(a) Defnyddiwch y graff i amcangyfrif cyflymiad *(acceleration)* y gronyn ar $t = 1{\cdot}5$.
Rhowch eich ateb i un lle degol. [3]

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(b) (i) Defnyddiwch y rheol trapesiwm, gyda'r mesurynnau $t = 0$, $t = 3$, $t = 6$ a $t = 9$ i amcangyfrif y pellter deithiodd y gronyn yn ystod yr arbrawf. [4]

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(ii) Trwy ystyried y graff sydd wedi'i roi, nodwch sut byddech chi'n gwella ar yr amcangyfrif ar gyfer y pellter deithiodd y gronyn yn ystod yr arbrawf. [1]

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12.

Mae'r tabl yn dangos gwerthoedd $y = -x^2 + 8x - 12$ ar gyfer gwerthoedd x o 1 i 8.

x	1	2	3	4	5	6	7	8
$y = -x^2 + 8x - 12$	−5	0	3	4	3	0		

(a) Cwblhewch y tabl uchod.

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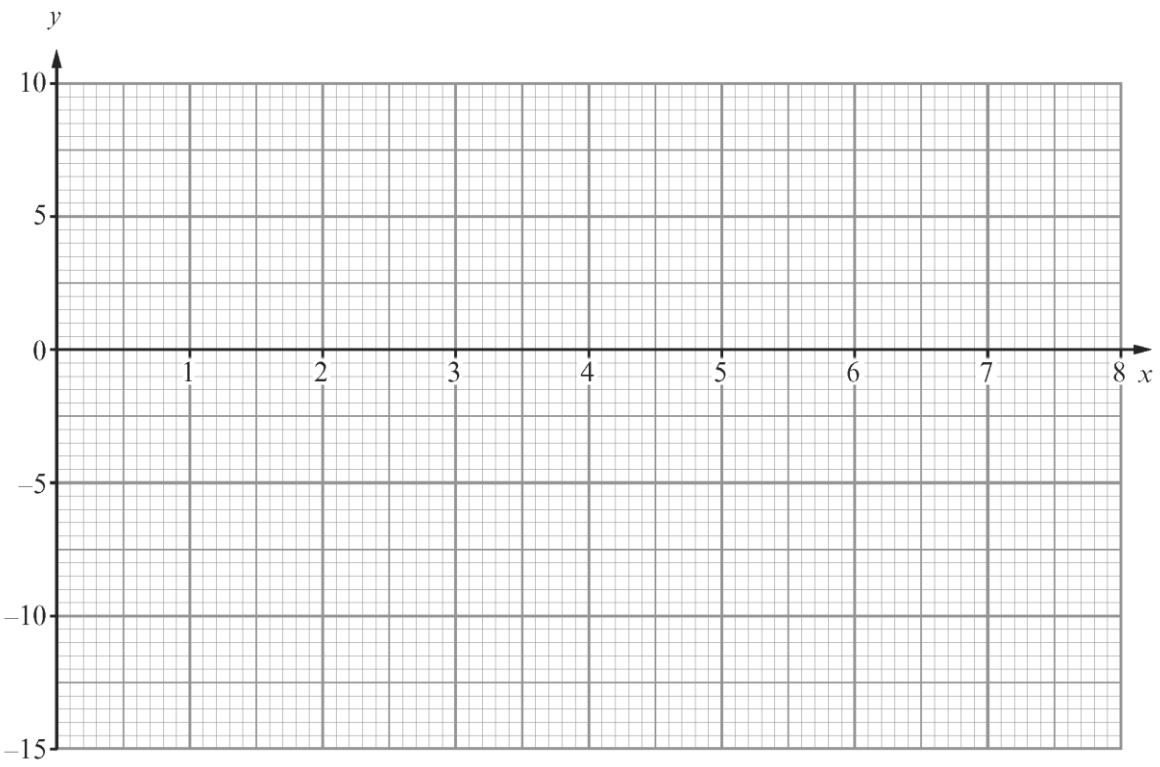
[2]

(b) Ar y papur graff isod, lluniadwch graff $y = -x^2 + 8x - 12$ ar gyfer gwerthoedd x o 1 i 8.
[2]



(c) Defnyddiwch eich graff i ysgrifennu datrysiadau'r hafaliad $-x^2 + 8x - 12 = 0$.

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[1]

(ch) Defnyddiwch y rheol trapesiwm, gyda'r mesurynnau $x = 2$, $x = 3$, $x = 4$, $x = 5$ ac $x = 6$, i amcangyfrif arwynebedd y rhanbarth sydd â'r gromlin a'r echelin x yn ffin iddo.

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[4]

13.

Mewn arbrawf cafodd ei ddarganfod bod cyflymder *(velocity)*, v mewn m/s, gronyn *(particle)* ar amser t eiliad ar ôl dechrau'r arbrawf yn cael ei roi gan yr hafaliad $v = 3t - t^2$.

(a) Lluniadwch graff **crwm** *(curved)* $v = 3t - t^2$ ar gyfer gwerthoedd t o 0 i 3, ar gyfer gwerthoedd cynyddol t mewn camau o 0·5. [5]

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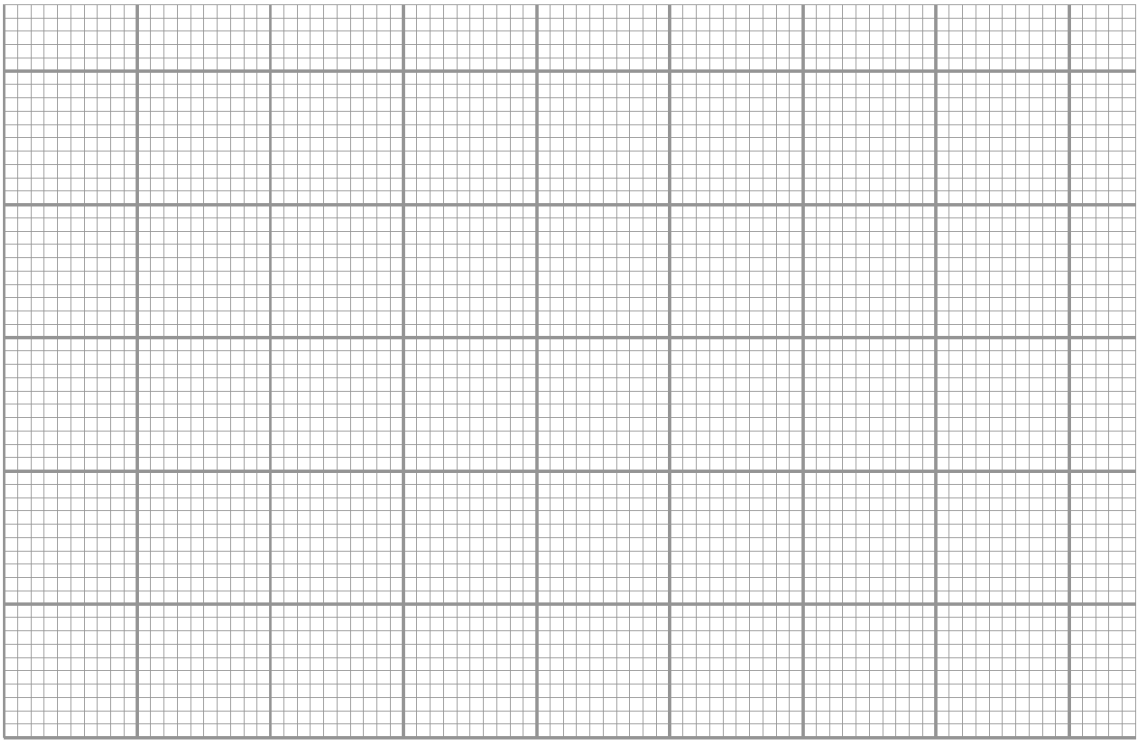

(b) Cyflymiad *(acceleration)* y gronyn yw cyfradd newid y cyflymder.

(i) Darganfyddwch yr amser pan fo cyflymiad y gronyn yn sero. [1]

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(ii) Darganfyddwch frasamcan *(approximation)* ar gyfer y cyflymiad pan fo $t = 2{\cdot}2$. [4]

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(c) Mae'r pellter wedi'i deithio gan y gronyn yn gallu cael ei ddarganfod gan ddefnyddio graff $v = 3t - t^2$.
Defnyddiwch y rheol trapesiwm i ddarganfod brasamcan ar gyfer y pellter wedi'i deithio gan y gronyn ar gyfer gwerthoedd t o 0 i 3. [4]

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14

Cynllun Marcio

1.

14(a) Drawing a reasonable tangent at t = 3	B1	
Gradient = **difference** in volume / **difference** in time	M1	M0 for 14/3. Tangent not requirement, however evidence of appropriate quotient based on differences is required
Reasonable gradient evaluated from their tangent	A1	
litres/minute	U1	Independent mark
(b) Rate of change of volume (with time)	E1	Do not accept 'increase in volume'. Accept 'increase of volume in time', 'how fast the tank is filling', 'amount per minute', 'speed of filling the tank'
	5	

2.

Unitised Unit 3 – June 2015 Higher Tier	✓		**Comments**
20. (a), (b) To be viewed with graph.			
(a) Tangent drawn.		S1	
Idea of increase in *y*/increase in *x*.		M1	Ignore signs for M1 only.
Gradient from a reasonable tangent.		A1	About −7.
(b) Split into 4 areas and attempt to sum		M1	
(Area =) ½×1(26 + 2×35 + 2×33 + 2×20 + 0)		M1	Or equivalent. Award for up to 1 error in reading scale.
= 101 (units^2)		A1	CAO

3.

14(a) Approximate period: 24 to 29 (minutes)	B1	Accept 25 to 30 (minutes) or 23 to 28 (minutes)
(b) Tangent drawn at t = 35	B1	
Method, difference y / difference x	M1	Not necessarily from a tangent
Evaluated answer from their reasonable tangent	A1	*(May be approximately 0.2)*
cm/min	U1	Accept 'cm per min(ute)'
(c) $562 = \pi \times r^2$	M1	
$r = \sqrt{(562/\pi)}$ (r = 13.37…)	m1	
C = 2 × π × their r	M1	FT their derived r
80 (cm)	A2	A1 for 84.0…
	10	

4.

5(a) Strategy, e.g. to draw a tangent at 7.5 seconds	S1	
Use of difference v / difference t	M1	Must be differences, not readings from axes. Ignore signs
= 0.4 to 0.6	A1	Reasonable from their graph. *Allow a fraction for example 4/7*
m/s^2 or m per s^2	U1	Does not depend on previous marks. Maybe shown on their graph
(b) Identifying the required area	S1	
Splitting area into areas that can be approximated	M1	Must include at least 1 calculation for an appropriate area, or correct statement of the trapezium rule
Complete calculation for the area required	M1	OR correct substitution into the trapezium rule, allow 1 slip
Accurately calculated area	A1	(Possible answers around 195 to 215 metres)
	8	

5.

(a) Use of area under the curve from 0s to 40s Correct method, e.g. including ½ ×5.1 ×40 Correct answer to calculation, e.g. 102(m)	S1 M1 A1	*Treat area 0 to 50 seconds as MR-1 then FT* Accept any suitable calculation for 1 or more blocks of area
(b) Tangent at t = 30 Use of difference in v / difference in t Acceleration …… (reasonable for their tangent)	M1 M1 A1	 Accept with or without sight of a tangent Must be evaluated from their tangent in the inclusive range 0.02 to 0.08 ms^{-2}
(c) (4) × 60 × 60 ÷ 1000 14.4 (km/h)	M1 M1 A1	

(d) Attempt to find at least one point, i.e. value of v for a value of t between 10 and 50
At least 2 correct plots or 2 appropriate values of v
Suitable curve between 40 and 50 or 3 values of v evaluated in the interval $40 \le t \le 50$
	S1
	
	P1
	C1
		<table><tr><td>t</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td></tr><tr><td>v</td><td>0.3</td><td>1.2</td><td>2.7</td><td>4.8</td><td>7.5</td></tr></table>
		t = 41, v = 5.043;
		t = 42, v = 5.292;
		t = 43, v = 5.547;
		t = 44, v = 5.808;
		t = 45, v = 6.075

(t is) in the range 41 to 42 seconds (to the nearest second)	B1 13	CAO *Allow B4 for a correct answer resulting from a substitution or trial method*

6.

15(a) 0	B1	
15(b) **Tangent** drawn at t = 3.5 Method, difference y / difference x Evaluated estimated answer from their reasonable **tangent**	B1 M1 A1	 The values used must be correct, do not allow 27/3.5 May not be from a tangent, but must be from use of differences, e.g. curve used to form a 'right-angled triangle' (Approximately 3.3 (m/min^2)
15(c)(i) Finding v values: (0,) 14, 29, 26, 30 Split into 4 areas and attempt to sum Correct substitution into trapezium rule 168 (metres)	B1 M1 M1 A1	Sight of (0,) 14, 29, 26, 30 Sight of the sum of 4 products or an attempt substitution of their 5 values in the trapezium rule Or equivalent. (14 + 43 + 55 + 56) or (0+28+ 58+52+30) FT their values for v provided at least 3 values are correct, OR 2 areas correct in sum of 4 possible
15(c)(ii) 0.168(km)	B1	FT their (i)/1000 evaluated correctly

7.

To be viewed with the graph. Split into 5 areas and attempt to sum. (Volume) ½×1×(0 + 2×52 + 2×55 + 2×46 + 2×30 + 0) = 183 litres	 ✓ ✓ ✓ ✓	 M1 M1 A1 U1	 Don't penalise a more accurate approximation. Or equivalent. Areas of 26, 53·5, 50·5, 38, 15 Award for up to 1 error in reading scale. CAO.

8.

11. Idea to find 4 areas of strip width ½ hour 2 + 4.75 + 5 + 4 15.75 km	B1 M2 A1 U1 5	 M1 for any 2 of the 4 areas correct, or '2 of their areas' correctly evaluated from an incorrect interpretation of the scale or of the ½ strip requirement, e.g. use of 4 or 30 for the horizontal Other A marks are included by sight of 15.75 Only award A1 for correct calculation based on 4 strips to 14:00 Independent mark. Accept other units from appropriate calculations

9.

15.(a) Finding the y values: (0,) 8, 7(, 0) Use of trapezium rule or splitting into the 3 areas required and attempt to sum Complete correct calculation for the area required 30 (m) (b) 'Under estimate' with reason suggesting that trapezium is beneath the curve	B1 M1 A1 A1 E1 5	May be shown on their graph FT their values for y (8 + 15 + 7) CAO Treat splitting area into 6 parts as MR-1, then follow the stages of the mark scheme

10.

(a) 14:30 i 14:45	B1	Derbyn unrhyw gyfnod ¼ awr o fewn 14:27 i 14:57 yn gynhwysol Caniatáu e.e. 2:30(p.m.) i 2:45(p.m.)
(b) Ateb yn yr ystod 15:09 i 15:15 yn gynhwysol	B1	Caniatáu e.e. 3:09(p.m.) i 3:15(p.m.) yn gynhwysol
(c) $\frac{18 \times 1000}{60 \times 60}$ 5 (metr yr eiliad)	M1 A1	Neu gywerth e.e. 18 × 5 ÷ 18

11.

2015 Summer Linear Paper 1 Higher Tier		**Comments**
18(a) Tangent drawn at t=1.5 Method, difference y / difference x Evaluated answer correct to 1dp from their reasonable tangent	B1 M1 A1	
18(b)(i) For the 4 appropriate values of v Split into the 3 areas and attempt to sum, or an attempt to substitute into the trapezium rule Correct substitution into trapezium rule, $^3/_2(0+0+2(8+5))$ 39 (m)	B1 M1 A1 A1	May be seen on the graph or in working t 0 3 6 9 v 0 8 5 0 *Attempt at substitution would be ... (0+0+2(8+5))* *or $^3/_2(0+0+2(8+5))$ with either 8 or 5 incorrect* OR for 3 correct areas 12, 19.5, 7.5 with an attempt to sum CAO
18(b)(ii) Example, 'use more ordinates', 'cut into narrower strips', or consideration of the additional area	E1	Do not accept 'count squares'

12.

(a) –5, –12 (un marc yr un)

(b) Plotio'r pwyntiau – un marc. Cysylltu efo cromlin esmwyth – ail farc.

(c) $x = 2, x = 6$

(ch) Hollti i mewn i 4 arwynebedd gwahanol (1 marc).

Naill ai 1.5 + 3.5 + 3.5 + 1.5 neu fformiwla rheol y trapesiwm (2 farc).

Ateb 10 (uned sgwâr) (1 marc).

13.

Applications Unit 1 Summer 2015	Mark	Comment
11(a) Correct evaluation of at least 3 coordinates	B1	<table><tr><td>t</td><td>0</td><td>0.5</td><td>1</td><td>1.5</td><td>2</td><td>2.5</td><td>3</td></tr><tr><td>v</td><td>0</td><td>1.25</td><td>2</td><td>2.25</td><td>2</td><td>1.25</td><td>0</td></tr></table>
Suitable axes with appropriate scale and labels	B1	FT for their axes if reasonable, for their points provided at least 3 are correct
Plotting at least 6 correct points	M2	M1 for plotting between 3 and 5 correct points
Joining all 7 correct points with a curve	A1	
(b)(i) (At t =) 1.5 (seconds)	B1	
(ii) Strategy, e.g. to draw a tangent at t = 2.2	S1	FT their graph Accept appropriate other methods, e.g. close calculations to 2.2
Use of difference v / difference t	M1	Must be differences for their right-angle triangle, not readings from axes
Their difference v / difference t	A1	Must be from a tangent drawn
Approximately **-1.4** (m/s^2)	A1	Reasonable from their graph
(c) Identifying the required area	S1	FT their graph. Maybe shown on their graph
Splitting area into areas that can be approximated, with correct v values	M1	*There was no equal width criterion given in this question*
Complete calculation for the area required	M1	FT their graph
Accurately calculated	A1	Depends on M2 awarded Do not accept an answer from premature approximation of their considered areas. *(Some possible answers include: 4.375 using 6 areas, 4 using 3 areas, 4.125 using 2 triangles of width 1 and 2 trapezia of width 0.5)*
	14	