



# Mark Scheme (Results)

January 2025

Pearson Edexcel Level 3 Award  
In Algebra (AAL30)  
Paper 01

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## NOTES ON MARKING PRINCIPLES

### 1 Types of mark

M marks: method marks

A marks: accuracy marks

B marks: unconditional accuracy marks (independent of M marks)

### 2 Abbreviations

cao – correct answer only

isw – ignore subsequent working

oe – or equivalent (and appropriate)

indep - independent

ft – follow through

SC: special case

dep – dependent

### 3 No working

If no working is shown then correct answers normally score full marks

If no working is shown then incorrect (even though nearly correct) answers score no marks.

### 4 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the “correct” answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

### **Follow through marks**

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

### **6 Ignoring subsequent work**

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

### **7 Parts of questions**

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

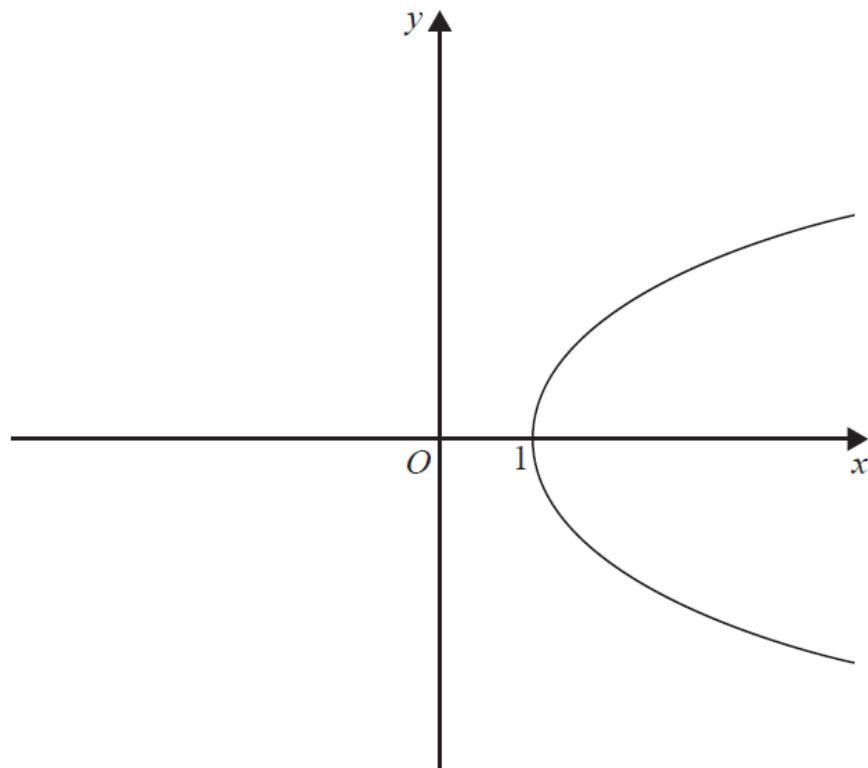
### **8 Use of ranges for answers**

If an answer is within a range this is inclusive, unless otherwise stated.

### Mark Scheme Edexcel Award in Algebra

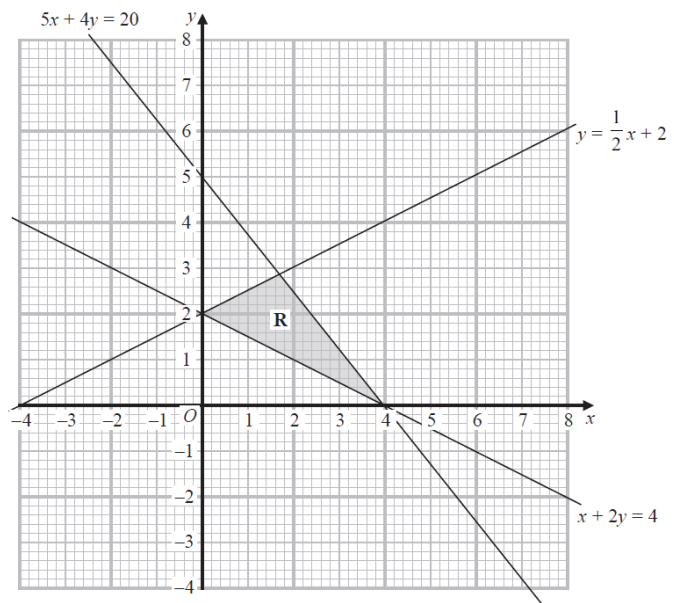
AAL30_01				
Question	Working	Answer	Mark	Notes
1	(a)	$n^{\frac{5}{2}}$	1	B1 for $n^{\frac{5}{2}}$ or $n^{2\frac{1}{2}}$ or $n^{2.5}$
	(b)	$t^6$	1	B1 cao
2	(a)	Tangent drawn	1	B1 for tangent drawn at (3, 4)
	(b)	$x = 0$	1	B1 oe
3		$k < 6.5$	2	M1 for dealing with fractions, eg $5(k - 2) < 3(k + 1)$ or $5k - 10 < 3k + 3$ or for a critical value of 6.5 oe A1 for $k < 6.5$ or $k < 6\frac{1}{2}$ or $k < \frac{13}{2}$

AAL30_01				
Question	Working	Answer	Mark	Notes
4		Sketch	2	M1 for parabola with line of symmetry, $y = c$ or for any parabola touching or intersecting $x$ -axis at $(1, 0)$ A1 for a correct sketch, including $(1, 0)$ marked at intersection with $x$ -axis



AAL30_01				
Question	Working	Answer	Mark	Notes
5 (a)		$(x + 1)(x + 8)$	1	B1 cao
(b)		$(5 + 4w)(3 - 2t)$	2	M1 for $5(3 - 2t)$ and $4w(3 - 2t)$ or $-5(-3 + 2t)$ and $-4w(-3 + 2t)$ or $3(5 + 4w)$ and $-2t(5 + 4w)$ or $-3(-5 - 4w)$ and $2t(-5 - 4w)$  A1 for $(5 + 4w)(3 - 2t)$ or $(-5 - 4w)(-3 + 2t)$ oe
(c)		$8y(y - 2)(y + 2)$	3	M1 for a correct partial factorisation as the product of at least 2 factors, eg $2(4y^3 - 16y)$ or $4(2y^3 - 8y)$ or $8(y^3 - 4y)$ or $(8y^2 - 16y)(y + 2)$ or $(8y^2 + 16y)(y - 2)$ or $y(8y^2 - 32)$ oe  M1 for a correct partial factorisation as the product of at least 3 factors, eg $2y(4y^2 - 16)$ or $4y(2y^2 - 8)$ or $8y(y^2 - 4)$ or $2(4y^2 - 8y)(y + 2)$ oe, etc  A1 for fully factorised expression

AAL30_01				
Question	Working	Answer	Mark	Notes
6 (a)		Correct region indicated	5	M1 for drawing $y = \frac{1}{2}x + 2$ M1 for drawing $5x + 4y = 20$ M1 for drawing $x + 2y = 4$ A2 for correctly shading required region (A1 for correct shading for 2 of the 3 inequalities, $y < \frac{1}{2}x + 2, 5x + 4y < 20, x + 2y > 4$ )
(b)	Boundary points (0, 2) (2, 1) (4, 0)	(1, 2), (2, 2), (3, 1)	2	B2 cao (B1ft for at least two correct and no more than one omission from their region, and none from outside the boundary. Ignore points given on the boundary)



AAL30_01				
Question	Working	Answer	Mark	Notes
7 (a)	$a = 8, n = 100, d = 4$	404	2	M1 for substitution into $a + (n - 1)d$ eg $8 + (100 - 1)4$ oe or for substitution into $n$ th term eg $4 \times 100 + 4$ A1 cao
(b)	$n = 200, a = 8, d = 4, l = 804$	81200	2	M1 for $\frac{n}{2}\{2a + (n - 1)d\}$ or $\frac{n}{2}\{a + l\}$ , may be implied by substitution eg $\frac{200}{2}\{2 \times 8 + (200 - 1) \times 4\}$ A1 cao

AAL30_01				
Question	Working	Answer	Mark	Notes
8 (a)	$\frac{-2 \pm \sqrt{2^2 - 4 \times 3 \times -7}}{2 \times 3}$	$\frac{-1 \pm \sqrt{22}}{3}$	3	M1 for correct substitution into the quadratic formula A1 for simplifying as far as $\frac{-2 \pm \sqrt{4 + 84}}{2 \times 3}$ A1 cao
(b)(i)		$5[(x - 2)^2 - 4]$	3	M1 for start to method for finding values, eg $5(x^2 - 4x)$ or $(x + d)^2 = x^2 + dx + dx + d^2$ M1 for second step, eg $x^2 - 4x = (x - 2)^2 - 4$ or $5(x - 2)^2 - 20$ or $2d = -4$ A1 (accept $c = 5, d = -2, e = -4$ ) SCB1 for $5[(x + 2)^2 - 4]$ if no other marks awarded
(ii)		$x < -3, x > 7$	3	M1 for (b)(i) $> 105$ oe (allow =) or $5x^2 - 20x - 105 (> 0)$ or $x^2 - 4x - 21 (> 0)$ or $5(x - 7)(x + 3) (> 0)$ or $(x - 7)(x + 3) (> 0)$ oe M1 (dep M1) for critical values, $-3, 7$ or for $x < -3$ or for $x > 7$ A1 for $x < -3$ (or) $x > 7$ (Do not accept $x < -3$ and $x > 7$ )

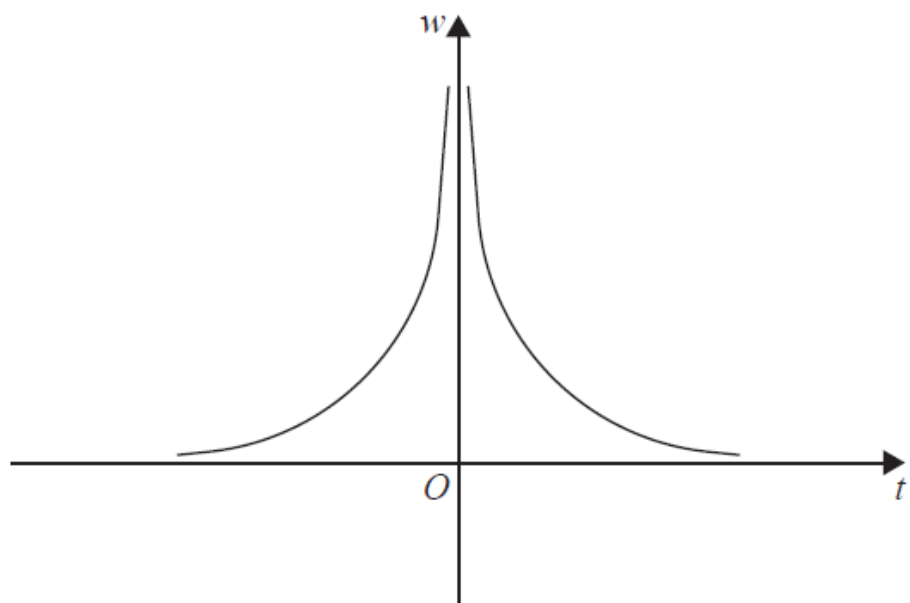
AAL30_01				
Question	Working	Answer	Mark	Notes
9 (a)		$3x + y = 14$	3	M1 for use of gradient of $L = -3$ , eg $2 = -3 \times 4 + c$ oe or for an equation of a line with gradient $-3$ eg $y = -3x + c, c \neq 4, c \neq 14$ or $3x + y = c, c \neq 4, c \neq 14$ oe or for $-3x + 14$ A1 for a correct equation in any form, eg $y = -3x + 14$ or $y - 2 = -3(x - 4)$ A1 for $3x + y = 14$ oe eg $-3x - y = -14$
(b)		$y = \frac{1}{3}x$	2	M1 for gradient = $\frac{1}{3}$ oe or for the equation of a line with gradient $\frac{1}{3}$ eg $y = \frac{1}{3}x + k$ or $y - \frac{1}{3}x = k$ where $k \neq 0$ oe or for $\frac{1}{3}x$ A1 for $y = \frac{1}{3}x$ oe

AAL30_01				
Question	Working	Answer	Mark	Notes
10 (a)		3.2	2	M1 for substitution, eg $\frac{3(5-0.5)}{5} + 0.5$ A1 for 3.2 oe eg $3\frac{1}{5}$ or $\frac{16}{5}$ or $\frac{32}{10}$
(b)		$e = \frac{gh-3h}{h-3}$	3	M1 for a correct first step, eg $gh = 3(h - e) + eh$ or for $g = \frac{3h-3e}{h} + e$ or $g - e = \frac{3(h-e)}{h}$ M1 for isolating terms in $e$ , eg, $-3e + eh = gh - 3h$ A1 for $e = \frac{gh-3h}{h-3}$ oe

AAL30_01				
Question	Working	Answer	Mark	Notes
11 (a)(i)		$-\frac{2}{4}$	1	B1 for $-\frac{2}{4}$ oe, eg $-\frac{1}{2}$ or $-0.5$
(ii)		$\frac{3}{4}$	1	B1 for $\frac{3}{4}$ oe eg 0.75
(b)(i)		$(2k - 5)^2$	3	M1 for $(b^2 - 4ac \Rightarrow) 5^2 - 4 \times (k - 5) \times -k$ A1 for $4k^2 - 20k + 25$ A1 for $(2k - 5)^2$ or $(5 - 2k)^2$
(ii)		Roots are real and equal	1	B1 for (roots are real and) equal if (a) correct or for ft answer in the form $(mk + n)^2$ from (a)

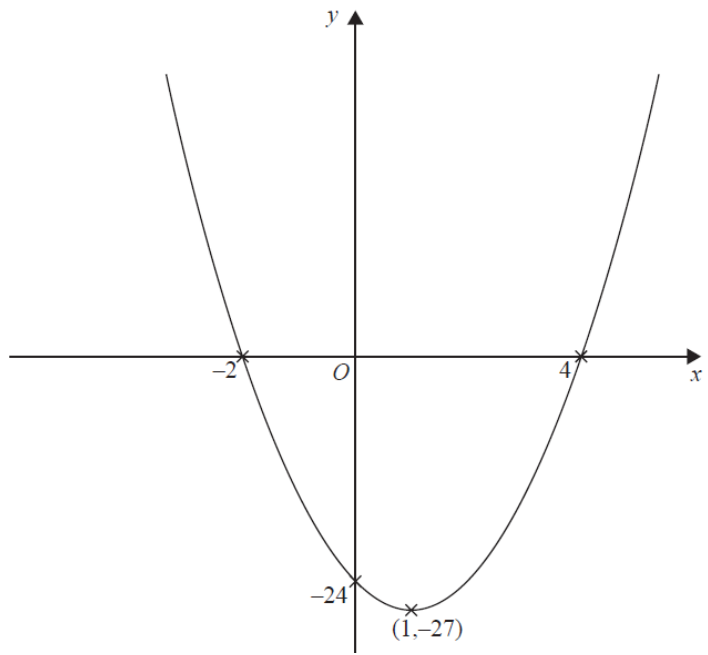
AAL30_01				
Question	Working	Answer	Mark	Notes
12 (a)		1.125	2	M1 for a method to find the gradient where the calculation leads to an answer in the range 1.1 – 1.17, eg $\frac{0.9}{0.8}$ A1 Accept answers in the range 1.1 – 1.17, eg $\frac{9}{8}$
(b)		2.34	2	M1 for method to find an area under the graph, eg $\frac{1}{2} \times 0.8 \times 0.9 (= 0.36)$ or $(3 - 0.8) \times 0.9 (= 1.98)$ or $\frac{0.9}{2} \{(3 - 0.8) + 3\}$ A1 cao  SCB2 for 2.08 if 0.8 used as speed in (a), eg $\frac{0.8}{0.8}$ SCB1 for a method using 0.8 to find an area under the graph if 0.8 used as speed in (a)

AAL30_01				
Question	Working	Answer	Mark	Notes
13 (a)		10.125	4	<p>M1 <math>w \propto \frac{1}{t^4}</math> or <math>w = \frac{k}{t^4}</math> oe, may be implied by substitution</p> <p>M1 for substitution to find <math>k</math>, eg <math>2 = \frac{k}{3^4}</math> or for <math>k = 162</math></p> <p>M1 for the substitution (<math>w =</math>) <math>\frac{162}{2^4}</math> oe</p> <p>A1 for 10.125 oe eg <math>10\frac{1}{8}</math> or <math>\frac{81}{8}</math> or <math>\frac{162}{16}</math></p>
(b)		Sketch	2	<p>B2 for a correct sketch</p> <p>(B1 for one correct branch)</p>



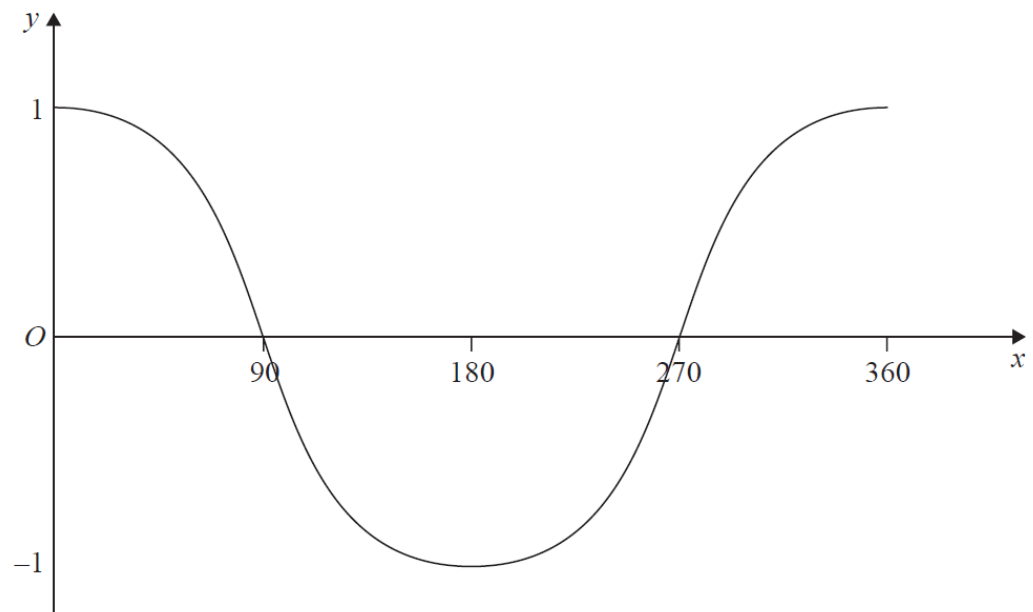
AAL30_01				
Question	Working	Answer	Mark	Notes
14		$-6 \pm \sqrt{31}$	5	<p>M1 for using a correct common denominator,  eg <math>\frac{x(1-x)+6(2x+1)}{(2x+1)(1-x)}</math> or <math>\frac{x(1-x)}{(2x+1)(1-x)} + \frac{6(2x+1)}{(2x+1)(1-x)}</math>  or for clearing the fractions,  eg <math>x(1-x) + 6(2x+1) = (2x+1)(1-x)</math></p> <p>M1 for clearing the fractions and expanding the brackets,  eg <math>x - x^2 + 12x + 6 = 2x - 2x^2 + 1 - x</math>  or <math>13x - x^2 + 6 = x - 2x^2 + 1</math> oe</p> <p>M1 for a correct 3-term quadratic equation,  eg <math>x^2 + 12x + 5 (= 0)</math> or <math>x^2 + 12x = -5</math></p> <p>M1 for substitution into the quadratic formula as far as  <math>\frac{-12 \pm \sqrt{124}}{2}</math>  or completing the square as far as <math>(x + 6)^2 = 31</math></p> <p>A1 cao</p>

AAL30_01				
Question	Working	Answer	Mark	Notes
15		Sketch graph	3	<p>M1 for correct shape and orientation</p> <p>M1(dep M1) for showing            (i) correct coordinates of points of intersection with the <math>x</math> axis, <math>(-2, 0)</math> and <math>(4, 0)</math>            or            (ii) correct coordinates of point of intersection with the <math>y</math> axis, <math>(0, -24)</math>            or            (iii) correct coordinates of the turning point. <math>(1, -27)</math></p> <p>A1 fully correct sketch in all 4 quadrants with coordinates of turning point and points of intersection with the axes shown</p>

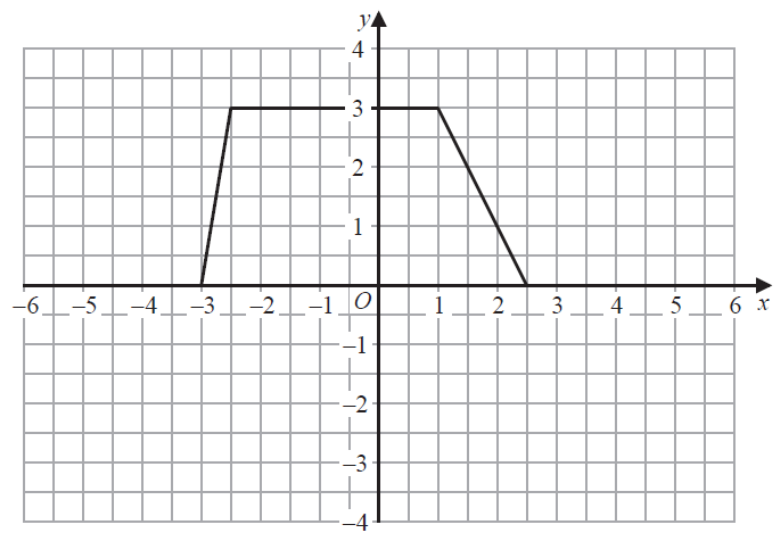
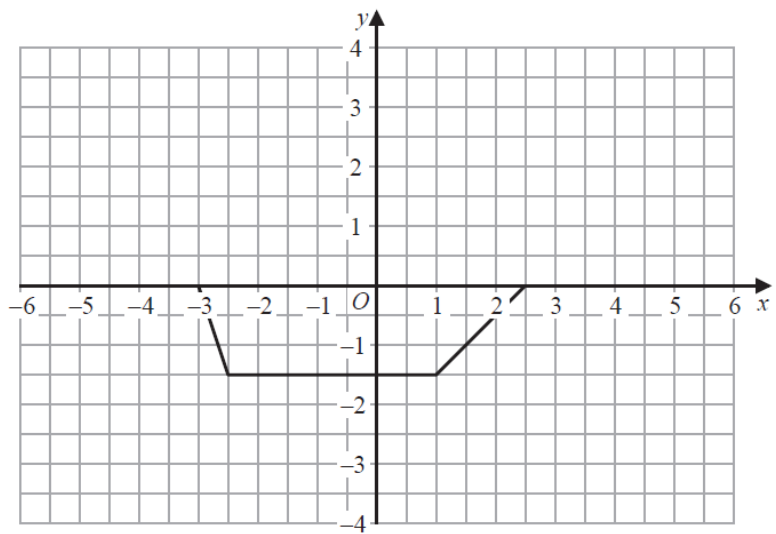


AAL30_01				
Question	Working	Answer	Mark	Notes
16		104	3	<p>M1 for stating values, eg (<math>y_0 =</math>) 32, (<math>y_1 =</math>) 36, (<math>y_2 =</math>) 32, (<math>y_3 =</math>) 20, (<math>y_4 =</math>) 0 (condone one error)            Condone omission of 0            Count as one error if <math>y_0</math> and <math>y_2</math> have the same incorrect value</p> <p>M1(dep) for substituting “values” and <math>h = 1</math> into trapezium rule,            eg <math>\frac{1}{2} \times 1 \{ (32 + 0) + 2(36 + 32 + 20) \}</math></p> <p>A1 cao</p>

AAL30_01				
Question	Working	Answer	Mark	Notes
17		Sketch	2	<p>M1 for correct shape and intersection of <math>x</math>-axis only at 90 and 270</p> <p>A1 for fully correct sketch showing maximum and minimum points at <math>y = 1</math> and <math>y = -1</math> respectively</p> <p>SCB1 for a correct sketch in the range <math>0 \leq x \leq 270</math> or <math>90 \leq x \leq 360</math> showing maximum and minimum points at <math>y = 1</math> and <math>y = -1</math> respectively</p>



AAL30_01				
Question	Working	Answer	Mark	Notes
18 (a)		$-2.75, 1.75$	2	M1 for showing $y = \frac{3}{4}$ on graph or for one correct solution, $-2.75$ or $1.75$ A1 for $-2.75, 1.75$ oe
(b)		Graph drawn	2	M1 for a reflection in $y = c$ or for 3 out of 4 points correct A1 cao
(c)		Graph drawn	2	M1 for a stretch parallel to $y$ axis, from $x$ axis or for 3 out of 4 points correct A1 cao



AAL30_01				
Question	Working	Answer	Mark	Notes
19 (a)		$\frac{5n + 25\sqrt{n}}{25 - n}$	3	M1 for multiplying by $\frac{5+\sqrt{n}}{5+\sqrt{n}}$ oe  M1 (dep M1) for correct expansion of numerator, eg $25\sqrt{n} + 5\sqrt{n} \sqrt{n}$ or for correct expansion of denominator, eg $25 - 5\sqrt{n} + 5\sqrt{n} - \sqrt{n} \sqrt{n}$  A1 oe in correct form
(b)		$6m$	3	M1 for inverting and multiplying, eg $\frac{4}{3\sqrt{m}} \times \frac{9m\sqrt{m}}{2}$ or for using a common denominator and dividing, eg $\frac{12m}{9m\sqrt{m}} \div \frac{2}{9m\sqrt{m}}$  M1 for a correct partial simplification in a correct expression, eg $\frac{2}{3\sqrt{m}} \times \frac{9m\sqrt{m}}{1}$ or $\frac{36m\sqrt{m}}{6\sqrt{m}}$ or $\frac{12m}{2}$ oe  A1 cao

AAL30_01				
Question	Working	Answer	Mark	Notes
20		$x = 2, y = -\frac{3}{2}$ and $x = -\frac{3}{2}, y = 2$	5	<p>M1 for substitution to obtain equation in one variable,  eg <math>4x^2 + (1 - 2x)^2 = 25</math> or <math>(1 - 2y)^2 + 4y^2 = 25</math>  or <math>4x^2 + 4(\frac{1-2x}{2})^2 = 25</math> or <math>4(\frac{1-2y}{2})^2 + 4y^2 = 25</math></p> <p>M1 for writing equation in the form <math>ax^2 + bx + c = 0</math>  or in the form <math>ay^2 + by + c = 0</math>  eg <math>8x^2 - 4x - 24 (= 0)</math> or <math>8y^2 - 4y - 24 (= 0)</math>  or <math>2x^2 - x - 6 (= 0)</math> or <math>2y^2 - y - 6 (= 0)</math> oe</p> <p>M1 for method to find the values for <math>x</math> or the values for  <math>y</math>,  eg <math>(x - 2)(2x + 3) (= 0)</math> or <math>(y - 2)(2y + 3) (= 0)</math>  or substitution into the quadratic formula  as far as <math>(x =) \frac{1 \pm \sqrt{49}}{4}</math> or <math>(y =) \frac{1 \pm \sqrt{49}}{4}</math>  or completing the square  as far as <math>(x - \frac{1}{4})^2 = \frac{49}{16}</math> or <math>(y - \frac{1}{4})^2 = \frac{49}{16}</math></p> <p>A1 for <math>x = 2, x = -\frac{3}{2}</math> or <math>y = 2, y = -\frac{3}{2}</math></p> <p>A1 for <math>x = 2, y = -\frac{3}{2}</math> oe and <math>x = -\frac{3}{2}, y = 2</math> oe</p>

