

Level 3 Algebra – Coordinate Geometry - Answers

June 2013 - Question 8

8		Gradient of L_1 is $-\frac{1}{2}$ Gradient of $L_2 = 2$ $y - 2 = 2(x - 3)$ $2x - y - 4 = 0$	$2x - y - 4 = 0$	3	M1 for method to find gradient of L_2 , eg use of $-\frac{1}{m}$ or sight of “ $m = 2$ ” M1 for method to find equation, ie use of $y - y_1 = m(x - x_1)$ or $y = mx + c$, with attempt to find c A1 for $2x - y - 4 = 0$ or $-2x + y + 4 = 0$ (accept $2x + -1y + -4 = 0$)
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Jan 2014 - Question 2

2	(a)	$2x - 5 = 6y$ $y = \frac{2}{6}x - \frac{5}{6}$	$\frac{1}{3}$	2	M1 for correct method to rearrange to $6y = 2x - 5$ or $y = \frac{1}{3}x + c$ A1 for $\frac{1}{3}$ oe
	(b)	$y = -5x + 10$	$y = \frac{1}{5}x + c$	2	M1 for correct method to find gradient of line perpendicular to $5x + y = 10$ A1 for $y = \frac{1}{5}x + c$ oe

Jan 2015 - Question 3

Question	Working	Answer	Mark	Notes	
3	(a)	Gradient of L_1 is $-\frac{3}{4}$ $y = -\frac{3}{4}x + c$ $1 = -\frac{3}{4} \times 2 + c$ $c = \frac{10}{4}$	$y = -\frac{3}{4}x + \frac{5}{2}$	3	M1 for method to find gradient of L_1 or sight of “ $m = -\frac{3}{4}$ ” M1 for method to find equation, ie use of $y - y_1 = m(x - x_1)$ or $y = mx + c$, with attempt to find c A1 for $y = -\frac{3}{4}x + \frac{5}{2}$
	(b)	Gradient of L_1 is $-\frac{3}{4}$ Gradient of $L_3 = \frac{4}{3}$ $y - -5 = \frac{4}{3}(x - 0)$	$4x - 3y - 15 = 0$	3	M1 for method to find gradient of L_3 , eg use of $-\frac{1}{m}$ or sight of “ $m = \frac{4}{3}$ ” M1 for method to find equation, ie use of $y - y_1 = m(x - x_1)$ or $y = mx + c$, with attempt to find c A1 for $4x - 3y - 15 = 0$ or $-4x + 3y + 15 = 0$ (accept $4x + -3y + -15 = 0$)

June 2015 - Question 14

14	(a)	$y = \frac{2}{7}x + \frac{6}{7}$	$\frac{2}{7}$	2	M1 correct method to re arrange to $y = mx + c$, eg $y = \frac{2x+6}{7}$, $y = \frac{2}{7}x + \frac{6}{7}$, $y = \frac{2}{7}x + c$ A1 cao
	(b)		$y = -\frac{7}{2}x + 12$	3	(If M0 then SC B1 for $\frac{2}{7}x$) M1 $m_1m_2 = -1$ oe used M1 for substitution of $(4, -2)$ into $y = mx + c$ or $y - y_1 = m(x - x_1)$ A1 for $y = -\frac{7}{2}x + 12$

Jan 2016 - Question 5

5	(a)		$x - 2y + 10 = 0$	2	M1 for $2y = x + 10$ or $2(y - 5) = x$ or $\frac{1}{2}x + 5 - y = 0$ A1 for $x - 2y + 10 = 0$ or $-x + 2y - 10 = 0$
	(b)(i)		$y = \frac{1}{3}x + 4$	4	M1 for use of correct gradient in the equation of a parallel straight line in any form. A1 for $y = \frac{1}{3}x + 4$
	(ii)		$y = -3x + 24$		M1 for correct gradient A1 for $y = -3x + 24$ oe

June 2016 - Question 5

5	(a)		$2x - y + 1 = 0$	3	M1 for a $\frac{-1-3}{-1-1}$ or $\frac{3--1}{1--1}$ or gradient = 2 or setting up a pair of simultaneous equations . M1 for complete method. A1 oe
	(b)		$y = -4x + c$	2	M1 for use of product of gradient equals -1 A1 oe

Jan 2017 - Question 5

5	(a)		$y = -\frac{5}{3}x + 5$	1	B1 for $y = -\frac{5}{3}x + 5$ oe
	(b)		$y = \frac{3}{5}x$	2	M1 for method to find gradient of L_2 A1 ft for $y = \frac{3}{5}x$ oe
	(c)		$y = -\frac{5}{3}x + 10$	2	M1 for use of correct gradient in the equation of a straight line in any form, eg $y = -\frac{5}{3}x + c$, $5x + 3y = c$ A1 ft for $y = -\frac{5}{3}x + 10$ oe

June 2017 - Question 13

Question	Working	Answer	Mark	Notes
13 (a)		$-\frac{1}{4}$	2	M1 for method to find the gradient of line T or use of $m_1m_2 = -1$ A1 for $-\frac{1}{4}$ oe
(b)		$12x - 3y + 11 = 0$	3	M1 for recognition of $m = 4$ M1 for method to find equation, ie use of $y - y_1 = m(x - x_1)$ or $y = mx + c$, with complete method to find c A1 $12x - 3y + 11 = 0$ oe

Jan 2018 - Question 9

Question	Working	Answer	Mark	Notes
9 (a)		$7x + 4y = 34$	3	M1 for method to find gradient of L_1 , eg $\frac{-2-5}{6-2} (= -\frac{7}{4})$ M1 for a correct equation in any form, eg $y - 5 = -\frac{7}{4}(x - 2)$ A1 for $7x + 4y = 34$ oe with integer coefficients in the form $ax + by = c$
(b)		$y = \frac{4}{7}x + 1$	3	M1 for method to find gradient of L_2 M1 (dep M1) for a method to find the equation in any form eg $5 = \frac{4}{7} \times 7 + c$ or $\frac{y-5}{x-7} = \frac{4}{7}$ A1 ft from (a) for $y = \frac{4}{7}x + 1$
(c)		No with reason	1	M1 for No, with reason, eg $3 \times \frac{1}{3} \neq -1$

June 2018 - Question 5

5	(a)		$-\frac{4}{3}$	2	M1 rearranging the equation to find the gradient eg $y = -\frac{4}{3}x + c$ A1 for $-\frac{4}{3}$ oe
	(b)		$4y - 3x + 28 = 0$ or $3x - 4y - 28 = 0$	3	M1 for method to use $m_1m_2 = -1$ in an equation of a straight line in any form. eg $y = \frac{3}{4}x + c$, $4y = 3x + c$ M1 (dep M1) for substitution of (12, 2) A1 for $4y - 3x + 28 = 0$ or $3x - 4y - 28 = 0$

Jan 2019 - Question 6

6	(a)		$-\frac{1}{2}$	2	M1 for rearrangement to isolate y , eg $y = -\frac{1}{2}x + \frac{5}{2}$ A1 for $-\frac{1}{2}$ oe
	(b)		2	1	B1 ft

Jan 2019 - Question 10

10	(a)		$4x - 5y - 13 = 0$	3	M1 for correct use of gradient, eg $y = \frac{4}{5}x + c$ M1 for a correct equation in any form. eg $y - -1 = \frac{4}{5}(x - 2)$ or $y = \frac{4}{5}x - \frac{13}{5}$ A1 for $4x - 5y - 13 = 0$ oe with integer coefficients
	(b)		$y = \frac{4}{5}x + \frac{8}{5}$	3	M1 for gradient of $L_2 = \frac{4}{5}$ ft from (a) M1 for a complete method to find equation A1 for $y = \frac{4}{5}x + \frac{8}{5}$ oe
	(c)		statement with supportive working	2	M1 for at least one correct gradient, $-\frac{3}{2}$ or $\frac{2}{3}$ A1 for line is perpendicular with reason, eg $-\frac{3}{2} \times \frac{2}{3} = -1$ oe

June 2019 - Question 10

Question	Working	Answer	Mark	Notes
10 (a)		$4x + 3y - 12 = 0$	3	M1 for method to find gradient of L , eg $-\frac{4}{3}$ M1 for complete method to find the value of c ($= 4$) A1 $4x + 3y - 12 = 0$ oe in correct form
(b)		$-\frac{4}{3}$	1	B1 ft their gradient from (a)

June 2019 - Question 13

13	(a)		$y = -\frac{2}{5}x + \frac{26}{5}$	3	M1 for use of the gradient of $-\frac{2}{5}$ in an equation of a straight line M1 (dep M1) for method to find c A1 $y = -\frac{2}{5}x + \frac{26}{5}$
	(b)		$y = \frac{5}{2}x - \frac{7}{2}$	2	M1 for using $mm = -1$ eg gradient of perpendicular line shown as $\frac{5}{2}$ A1 for $y = \frac{5}{2}x - \frac{7}{2}$ oe

Jan 2020 - Question 8

Question	Working	Answer	Mark	Notes
8 (a)		$x - 2y = 2$	1	B1 for eg $x - 2y = 2$ or $-x + 2y = -2$
(b)		$y = \frac{1}{2}x - 5$	3	M1 for use of gradient of $L_2 = \frac{1}{2}$, eg $y = \frac{1}{2}x + c$ M1 for a correct method to find c , eg $-6 = \frac{1}{2} \times -2 + c$ A1 for $y = \frac{1}{2}x - 5$

Jan 2020 - Question 12

12 (a)		$-\frac{4}{3}$	2	M1 for method to find gradient, eg rearrangement to $y = -\frac{4}{3}x - \frac{2}{3}$ A1 for $-\frac{4}{3}$ oe
(b)	$y = \frac{3}{4}x + c$ $-2 = \frac{3}{4} \times 1 + c$ $c = -\frac{11}{4}$ $y = \frac{3}{4}x - \frac{11}{4}$ $3x - 4y - 11 = 0$	$3x - 4y - 11 = 0$	3	M1 for using relationship between gradient of normal and tangent, eg gradient of tangent = $\frac{3}{4}$ or ft from (a) M1(dep M1) for method to find c , eg $-2 = \frac{3}{4} \times 1 + c$ or $c = -\frac{11}{4}$ or $y + 2 = \frac{3}{4}(x - 1)$ A1ft for $3x - 4y - 11 = 0$ oe provided in correct form

Jan 2021 - Question 15

Question	Working	Answer	Mark	Notes
15 (a)		$y = 3x - 4$	3	M1 for full method to find gradient, eg $\frac{-5-7}{-2-2}$ M1 for substituting in values to find c , eg $5 = m \times 3 + c$ A1 for $y = 3x - 4$
(b)		$-\frac{1}{3}$	1	B1 ft "gradient" from part (a)

Jan 2022 - Question 6

6 (a)		$-\frac{4}{5}$	2	M1 for method to find gradient, eg $\frac{5-1}{-2-3}$ A1 oe
(b)		$y = -\frac{4}{5}x + \frac{17}{5}$	3	M1 for use of gradient $-\frac{4}{5}$ in an equation ft (a), eg $y = -\frac{4}{5}x + c$ M1 for correct method to find c , ft (a) eg $1 = -\frac{4}{5} \times 3 + c$ or $y - 1 = -\frac{4}{5}(x - 3)$ A1 for $y = -\frac{4}{5}x + \frac{17}{5}$

Jan 2022 - Question 13

13		$x + 4y - 21 = 0$	4	M1 for using relationship between gradient of normal and tangent, eg gradient of normal = $-\frac{1}{4}$ M1 for method to find c , eg $5 = -\frac{1}{4} \times 1 + c$ or $c = \frac{21}{4}$ M1 for equation of line, eg $y = -\frac{1}{4}x + \frac{21}{4}$ A1 for $x + 4y - 21 = 0$ or $21 - x - 4y = 0$
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June 2022 - Question 8

8		2 real and equal supported	2	M1 for $(-12)^2 - 4 \times 9 \times 4$ oe A1 for statement from $(b^2 - 4ac) = 0$
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June 2022 - Question 18

18		$15x + 4y - 13 = 0$	3	M1 for a method to find the correct gradient, eg $\frac{7-8}{-1-3}$ ($= -\frac{15}{4}$) M1 for a correct equation in any form, eg $y = -\frac{15x}{4} + \frac{13}{4}$ or $y - -8 = -\frac{15}{4}(x-3)$ A1 for $15x + 4y - 13 = 0$ oe in correct form
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Jan 2023 - Question 5

5	(a)	$2x - 3y + 12 = 0$	3	M1 for use of gradient $\frac{2}{3}$ in an equation of a straight line or for $y = mx + 4$ A1 for a correct equation of the straight line in any form eg $3y = 2x + 12$ A1 oe in correct format
	(b)	$y = -\frac{3}{2}x - 8$	3	M1 for using $m_1m_2 = -1$ eg gradient of perpendicular line shown as $-\frac{3}{2}$ M1 for a method to find the value of c eg $-5 = "-\frac{3}{2}" \times -2 + c$ or for $y - -5 = "-\frac{3}{2}"(x - -2)$ A1 cao

June 2023 - Question 9

Question	Working	Answer	Mark	Notes
9	(a)	$y = \frac{1}{2}x + \frac{7}{2}$	3	M1 for method to find the gradient, eg $\frac{6-3}{5--1}$ or $\frac{3-6}{-1-5}$ or gradient $= \frac{1}{2}$. M1 for method to find c , eg $3 = "\frac{1}{2}" \times -1 + c$ or for correct equation not in required form, eg, $y - 3 = "\frac{1}{2}"(x - -1)$ A1 for $y = \frac{1}{2}x + \frac{7}{2}$ oe in required form
	(b)	$2x + y = 6$	3	M1 for use of product of gradients equals -1 , eg $\frac{1}{-0.5}$ or for gradient $= -2$ M1 for method to find c , eg $-2 = -2 \times 4 + c$ or for correct equation not in required form, eg, $y - -2 = -2(x - 4)$ A1 for $2x + y = 6$ oe in required form, ft (a)

Jan 2024 - Question 7

Question	Working	Answer	Mark	Notes
7	(a)	$\frac{3}{4}$	1	B1 for $\frac{3}{4}$ oe
	(b)	$y = -\frac{5}{2}x$	2	M1 for $-\frac{5}{2}$ oe A1 for $y = -\frac{5}{2}x$ oe

Jan 2024 - Question 18

Question	Working	Answer	Mark	Notes
19 (a)		Graph drawn	2	M1 all points correctly plotted or for 5 or 6 points plotted correctly and joined with a curve A1 fully correct graph
(b)		-1.6	2	M1(dep M1) for a line drawn at $y = 6$ or for $2^{1-x} = 6$ A1 for -1.6 or ft from graph
(c)		5.25	2	M1 for substituting values and $h = 1$ into trapezium rule, eg $\frac{1}{2}(4 + \frac{1}{2} + 2(2 + 1))$ A1 for 5.25 oe

