STRAIGHT LINE GRAPH ANSWERS EDEXCEL A LEVEL YEAR 1

1.

(a)	$p = 15,\quad q = -3$	B1 B1	(2)
(b)	Grad. of line ADC: $m = -\frac{5}{7}$, Grad. of perp. line $= -\frac{1}{m}\left(= \frac{7}{5}\right)$	B1, M1	
	Equation of l: $y - 2 = \frac{7}{5}(x - 8)$	M1 A1ft	
	$7x - 5y - 46 = 0$ (Allow rearrangements, e.g. $5y = 7x - 46$)	A1	(5)
(c)	Substitute $y = 7$ into equation of l and find $x = \dots$	M1	
	$\frac{81}{7}$ or $11\frac{4}{7}$ (or exact equiv.)	A1	(2)
			9

2.

(a) $y = 5 - (2 \times 3) = -1$	(or equivalent verification) (*)	B1	
			(1)
(b) Gradient of L is $\frac{1}{2}$		B1	
$y - (-1) = \frac{1}{2}(x - 3)$	(ft from a changed gradient)	M1 A1ft	
$x - 2y - 5 = 0$	(or equiv. with integer coefficients)	A1	
			(4)

3.

(a) $m = \frac{4-(-3)}{-6-8}$ or $\frac{-3-4}{8-(-6)}$, $= \frac{7}{-14}$ or $\frac{-7}{14}$ $\left(=-\frac{1}{2}\right)$	M1, A1	
Equation: $y-4 = -\frac{1}{2}(x-(-6))$ or $y-(-3) = -\frac{1}{2}(x-8)$	M1	
$x+2y-2=0$ (or equiv. with <u>integer</u> coefficients… must have '= 0')	A1	(4)
(e.g. $14y+7x-14=0$ and $14-7x-14y=0$ are acceptable)		
(b) $(-6-8)^2+(4-(-3))^2$	M1	
14^2+7^2 or $(-14)^2+7^2$ or $14^2+(-7)^2$ (M1 A1 may be implied by 245)	A1	
$AB=\sqrt{14^2+7^2}$ or $\sqrt{7^2(2^2+1^2)}$ or $\sqrt{245}$		
$7\sqrt{5}$	A1cso	(3)
		7

4.

(a)	$y-5=-\frac{1}{2}(x-2)$ or equivalent, e.g. $\frac{y-5}{x-2}=-\frac{1}{2}$, $y=-\frac{1}{2}x+6$	M1A1, A1cao	(3)
(b)	$x=-2 \Rightarrow y=-\frac{1}{2}(-2)+6 = 7$ (therefore B lies on the line) (or equivalent verification methods)	B1	(1)
(c)	$(AB^2=)\ (2--2)^2+(7-5)^2$, $=16+4=20$, $AB=\sqrt{20}=2\sqrt{5}$	M1, A1, A1	(3)
(d)	C is $(p,\ -\frac{1}{2}p+6)$, so $AC^2=(p-2)^2+\left(-\frac{1}{2}p+6-5\right)^2$	M1	
	Therefore $25=p^2-4p+4+\frac{1}{4}p^2-p+1$	M1	
	$25=1.25p^2-5p+5$ or $100=5p^2-20p+20$ (or better, RHS simplified to 3 terms)	A1	
	Leading to: $0=p^2-4p-16$ (*)	A1cso	(4)
			[11]

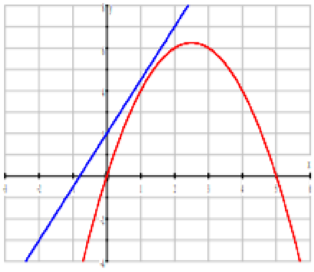
5.

(a) Putting the equation in the form $y = mx\ (+c)$ and attempting to extract the m or mx (not the c), or finding 2 points on the line and using the correct gradient formula.	M1
Gradient $= -\frac{3}{5}$ (or equivalent)	A1 (2)
(b) Gradient of perp. line $= \frac{-1}{"\left(-3/5\right)"}$ (Using $-\frac{1}{m}$ with the m from part (a))	M1
$y - 1 = "\left(\frac{5}{3}\right)"(x-3)$	M1
$y = \frac{5}{3}x - 4$ (Must be in this form... allow $y = \frac{5}{3}x - \frac{12}{3}$ but not $y = \frac{5x-12}{3}$) This A mark is dependent upon both M marks.	A1 (3) **[5]**

6.

(a)	$(8-3-k=0)$ so $k=5$	B1 (1)
(b)	$2y = 3x + k$ $y = \frac{3}{2}x + \ldots$ and so $m = \frac{3}{2}$ o.e.	M1 A1 (2)
(c)	Perpendicular gradient $= -\frac{2}{3}$ Equation of line is: $y - 4 = -\frac{2}{3}(x-1)$ $3y + 2x - 14 = 0$ o.e.	B1ft M1A1ft A1 (4)
(d)	$y = 0, \Rightarrow B(7,0)$ or $x = 7$ $x = 7$ or $-\frac{c}{a}$	M1A1ft (2)
(e)	$AB^2 = (7-1)^2 + (4-0)^2$ $AB = \sqrt{52}$ or $2\sqrt{13}$	M1 A1 (2) **11**

7.

(a)	$x(5-x)=\frac{1}{2}(5x+4)$ (o.e.)	M1	
	$2x^2-5x+4(=0)$ (o.e.) e.g. $x^2-2.5x+2(=0)$	A1	
	$b^2-4ac=(-5)^2-4\times2\times4$	M1	
	$=25-32$ <0, so no roots or no intersections or no solutions	A1	(4)
(b)	 Curve: $\cap$ shape and passing through (0, 0)	B1	
	$\cap$ shape and passing through (5, 0)	B1	
	Line : +ve gradient and no intersections with C. If no C drawn score B0	B1	
	Line passing through (0, 2) and $(-0.8, 0)$ marked on axes	B1	(4)
		8 marks	

8.

(a)	Gradient of l_2 is $\frac{1}{2}$ or 0.5 or $\frac{-1}{-2}$	B1	
	Either $y-6=\text{"}\frac{1}{2}\text{"}(x-5)$ or $y=\text{"}\frac{1}{2}\text{"}x+c$ and $6=\text{"}\frac{1}{2}\text{"}(5)+c \Rightarrow c=(\text{"}\frac{7}{2}\text{"})$	M1	
	$x-2y+7=0$ or $-x+2y-7=0$ or $k(x-2y+7)=0$ with ***k* an integer**	A1	[3]
(b)	Puts $x=0$, or $y=0$ in **their** equation and solves to find appropriate co-ordinate	M1	
	x-coordinate of A is -7 and y-coordinate of B is $\frac{7}{2}$.	A1 cao	[2]
(c)	Area $OAB=\frac{1}{2}(7)\left(\frac{7}{2}\right)=\frac{49}{4}$ (units)^2 — Applies $\pm\frac{1}{2}$(base)(height)	M1	
	$\frac{49}{4}$	A1cso	[2]
		7 marks	