International GCSE Maths					
Apart from Questions 3b, 13, 17 and 18 (where the mark scheme states otherwise), the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.					
Q		**Working**	**Answer**	**Mark**	**Notes**
1	(a)	1 – (0.24 + 0.16 + 0.38) oe		2	M1
			0.22		A1 oe
	(b)	0.24 + 0.16 (= 0.4) oe		2	M1
			0.4		A1 oe
					Total 4 marks

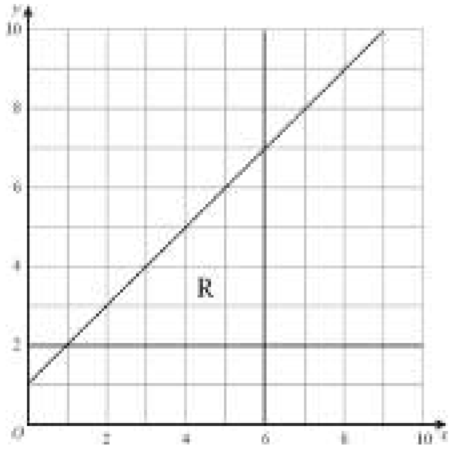
<table>
<tr><td>2 (a)</td><td colspan="2">720 ÷ 12 (= 60) or 78 × 12 (= 936)</td><td></td><td>4</td><td colspan="2">M1</td></tr>
<tr><td></td><td>78 – ‘60’ (= 18)
or ‘936’ – 720 (= 216)</td><td>$'x' \times 720 = 936$
or $720(1+\frac{P}{100}) = '936'$
or $('x' =) \frac{'936'}{720} (= 1.3)$ oe</td><td></td><td></td><td colspan="2">M1</td></tr>
<tr><td></td><td>$\frac{'18'}{60} \times 100$ or $\frac{'216'}{720} \times 100$</td><td>$'1.3' \times 100 - 100$ oe
or $(1.3 - 1) \times 100$</td><td></td><td></td><td colspan="2">M1 complete method to find P</td></tr>
<tr><td></td><td colspan="2"></td><td>30</td><td></td><td colspan="2">A1 ignore extra % sign if given by candidate.</td></tr>
<tr><td>(b)</td><td colspan="2">0.18 × 1600 (= 288) oe
or 0.82 × 1600 + 800 (= 2112)</td><td></td><td>3</td><td>M1 if 1600 × 18% seen, must have further processing of the 18% or the value (288) given.</td><td rowspan="2">M2 for 1.5 × 12.5 (= 18.75)
or
18 ÷ 1.5 (= 12)</td></tr>
<tr><td></td><td colspan="2">0.125 × (1600 + 800) (= 300) oe
or (1600 + 800) × 0.875 (= 2100)</td><td></td><td></td><td>M1</td></tr>
<tr><td></td><td colspan="2"></td><td>Coupon B and correct figures seen</td><td></td><td colspan="2">A1 for Coupon B and
288 and 300 or
18.75(%) and 18(%) or
12(%) and 12.5(%) or
2112 and 2100</td></tr>
<tr><td></td><td colspan="2"></td><td></td><td></td><td colspan="2">Total 7 marks</td></tr>
</table>

3 (a)	$4y > 12 - 5$		2	M1 Allow $y = \frac{7}{4}$ oe or $y > -\frac{7}{4}$ or $y < \frac{7}{4}$
		$y > \frac{7}{4}$		A1 oe
(b)	$12x - 10$ **or** $2(6x - 5) = 4x - 7$ **or** $6x - 5 = \frac{4}{2}x - \frac{7}{2}$ oe		3	M1 for removal of fraction **and** multiplying out LHS **or** rearranging to remove the fraction **or** separating fraction (RHS) in an equation
	$12x - 4x = -7 + 10$ oe **or** $6x - \frac{4}{2}x = -\frac{7}{2} + 5$ oe			M1 ft (dep on 4 terms) for terms in x on one side of equation and number terms on the other
		$\frac{3}{8}$		A1 (dep M1) oe
				Total 5 marks

4	360 ÷ 8 (= 45) or 360 ÷ 5 (= 72) or 180 – (360 ÷ 8) (= 135) oe or 180 – (360 ÷ 5) (= 108) oe		4	M1 finding interior or exterior angle of octagon or pentagon Angles may be seen on diagram – but must be obtuse if interior and acute if exterior.
	‘72’ – ‘45’ (= 27) or ‘135’ – ‘108’ (= 27)			M1 (dep 1st M1) using a pair of interior or pair of exterior angles to find angle *IBC* Angle may be seen on diagram.
	$\frac{180-'27'}{2}$ (= 76.5)			M1
		76.5		A1
				Total 4 marks

5	7200 × 0.025 (= 180) or 7200 × 1.025 (= 7380) oe or 7200 × 1.075 (= 7740) oe or 7200 × 0.075 (= 540) oe		3	M1	M2 for $7200 \times (1.025)^3$
	(7200 + ‘180’) × 0.025 (= 184.5) and (7200 + ‘180’ + ‘184.5’) × 0.025 (= 189.1125) and 7200 + ‘180’ + ‘184.5’ + ‘189.1…’ (= 7753.6125)			M1 NB year end values are 7380 and 7564.5(0) 7753.6125	
		7754		A1 answer in range 7753 – 7754	
				Total 3 marks	

6 (a)		1	1	B1
(b)		6	1	B1
(c)	$206 + m - 214 = -3$ oe or $\frac{7^{-3} \times 7^{214}}{7^{206}}$ or $\frac{7^{211}}{7^{206}}$ oe		2	M1 allow $7^{206+m-214} = 7^{-3}$ oe (must be in the form $7^x = 7^y$ where x and y are correct expressions)
		5		A1 accept 7^5
				Total 4 marks

7 (a)			$y = -3x + 5$ oe	2	B2 fully correct equation eg $y = -3x + 5$ or $y - 5 = -3(x - 0)$ If not B2 then B1 for $y = -3x + a$ with $a \neq 5$ or $y = bx + 5$ ($b \neq 0, -3$) or (L =) $-3x + 5$
(b)	Lines (solid or dashed) $x = 6$ **and** $y = 2$ drawn			3	B1 The lines $x = 6$ and $y = 2$ should extend far enough to intersect with each other.
	Line (solid or dashed) $y = x + 1$ drawn				B1 The line should extend from at least $x = 1$ to $x = 6$ **or** far enough to intersect with their horizontal and vertical lines.
	Region R shown (shaded or not shaded) 		Correct region identified		B1 dep on B2
					Total 5 marks

8	22 × 260 (= 5720) or 50 × 218 (= 10 900)		3	M1
	$\frac{'10900' - '5720'}{28}$ $\left(= \frac{5180}{28}\right)$			M1
		185		A1
				Total 3 marks

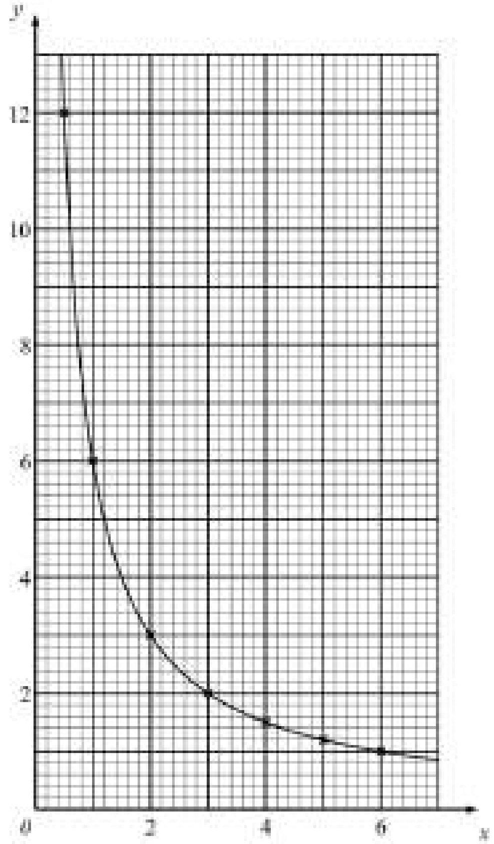
9	$\cos 30 = \frac{24}{(AC)}$ or $\sin '60' = \frac{24}{(AC)}$ **or** $\frac{\sin '60'}{24} = \frac{\sin 90}{(AC)}$ oe		5	M1 for correct trig ratio involving AC	M2 for use of tan **and** Pythagoras to obtain AC $(AB =)\ 24\tan 30\ (= 13.856...)$ **and** $\sqrt{'13.856...'^2 + 24^2}\ (= 27.712...)$ If not M2, then M1 for use of tan and Pythagoras to obtain AC^2 $(AB =)\ 24\tan 30\ (= 13.856...)$ **and** $'13.856...'^2 + 24^2\ (= 768)$
	$(AC =) \frac{24}{\cos 30}$ (= $16\sqrt{3}$ = 27.712…) or $(AC =) \frac{24}{\sin '60'}$ (= $16\sqrt{3}$ = 27.712…) **or** $(AC =) \frac{24 \times \sin 90}{\sin '60'}$			M1 for a correct trig ratio for AC	
	$\frac{1}{2} \times 2 \times \pi \times 3\ (= 3\pi = 9.424\ldots)$			M1 for using $\pi \times 2 \times 3$ or $2\pi \times 3$	
	'27.712…' + '9.424…' – 2×3			M1 for a complete method to find the length *AFEDC*	
		31		A1 accept answers in range from 31 to 31.15	
					Total 5 marks

10	$(4.2 \times 10^{10}) \div (8.7 \times 10^{6})$ (= 4827.58…) or $(3.7 \times 10^{9}) \div (6.3 \times 10^{5})$ (= 5873.01…) **or** 42 000 000 000 ÷ 8 700 000 (= 4827.58…) or 3 700 000 000 ÷ 630 000 (= 5873.01…)		3	M1
	'5873.01…' – '4827.58…' (= 1045.42…) or $\dfrac{42000000000}{8700000} - \dfrac{3700000000}{630000}$ oe			M1 dep on M1
		1045		A1 Answer in range 1045 – 1045.5 or 1.045×10^{3} to 1.0455×10^{3}
				Total 3 marks

<table>
<tr><td>11</td><td>(a)</td><td>

x	0.5	1	2	3	4	5	6
y	**12**	6	**3**	2	**1.5**	**1.2**	1

</td><td>Correct table</td><td>2</td><td>B2 for all 4 correct values oe (ie $\frac{6}{5}$ or $\frac{3}{2}$)

(B1 for 2 or 3 correct values)</td></tr>
<tr><td></td><td>(b)</td><td>
</td><td>Correct graph
7 points joined by a smooth curve.</td><td>2</td><td>M1ft (dep B1 in (a)) for 6 or 7 points plotted correctly using their values (within the circles on overlay).
May be implied by curve passing through correct point.

A1ft only allow one incorrect value from the table in (a), and for a curve that is decreasing throughout for x = 0.5 to x = 6.

Ignore graph to the right of (6, 1) and to the left of (0.5, 12)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>Total 4 marks</td></tr>
</table>

12	$\tan 'x' = \frac{30.7-6.2}{244}$ or $\tan 'x' = \frac{244}{30.7-6.2}$ or $\sqrt{244^2 + '24.5'^2}\left(= \sqrt{60136.25} = 245.2...\right)$ **and** $\sin 'x' = \frac{'24.5'}{'\sqrt{60136.25}'}$ or $\cos 'x' = \frac{244}{'\sqrt{60136.25}'}$		3	M1 for suitable trig expression for their choice of variable *x* to represent either of the (non right-angle) angles in the triangle.
	$\tan^{-1}\left(\frac{'24.5'}{244}\right)$ or $90 - \tan^{-1}\left(\frac{244}{'24.5'}\right)$ or $\sqrt{244^2 + '24.5'^2}\left(= \sqrt{60136.25} = 245.2...\right)$ **and** $\sin^{-1}\left(\frac{'24.5'}{'\sqrt{60136.25}'}\right)$ or $\cos^{-1}\left(\frac{244}{'\sqrt{60136.25}'}\right)$ or $\cos^{-1}\left(\frac{'245.2...'^2 + '24.5'^2 - 244^2}{2 \times '245.2...' \times '24.5'}\right)$			M1 using a suitable trig expression to find the angle of depression. **or** for using Pythagoras to find hypotenuse **and** a suitable trig expression to find the angle of depression.
		5.7		A1 answers in the range 5.65 to 5.75 SC B2 for 84.3 (or in the range 84.25 to 84.35) **or** 264.3 (or in the range 264.25 to 264.35) given as answer.
				Total 3 marks

13	$\sqrt{8}+4-\left(\sqrt{8}-4\right)(=8)$ **and** $\sqrt{8}+4+\left(\sqrt{8}-4\right)\left(=2\sqrt{8}=4\sqrt{2}\right)$	$(a+b)(a-b)=a^2-b^2$ **and** $(\sqrt{8}+4)^2-(\sqrt{8}-4)^2$		3	M1 for correct substitutions into expression for $a+b$ **and** $a-b$ **or** expand the expression to get a^2-b^2 **and** substitute into this expression.
	$('8')('2\sqrt{8}')$ or $\sqrt{2048}$ or $16\sqrt{8}$ or $32\sqrt{2}$ or $8\sqrt{32}$ or $8\sqrt{8\times 4}$ oe				M1 (dep M1)
			8		A1 (dep both M marks)
					Total 3 marks

14 (a)		48	1	B1 allow 47 – 49 Accept $\frac{n}{110}$ where *n* is in the range 47 – 49
(b)		46	1	B1 allow 45.5 – 46.5
(c)	40 **and** 56		2	M1 for both values. LQ of 40 – 41 and UQ in the range 56 – 58. **or** for use of 15 and 45 (eg indicated by marks on horizontal axis that correspond to 15 and 45 on the vertical axis.) **or** for use of 15.25 and 45.75 (eg indicated by marks on horizontal axis that correspond to 15.25 and 45.75 on the vertical axis.
		16 to 18		A1 accept 16 to 18
(d)		Yes and correct reason	1	B1ft dep on M1 in (c) but ft their reading of the horizontal axis. For stating yes **and** the <u>IQR</u> for the <u>Algebra</u> test is <u>greater</u> than IQR for the Geometry test oe If using value in (c) less than 9, only accept 'no' and <u>IQR</u> for the <u>Algebra</u> test is <u>less</u> than the IQR for the Geometry test oe.
(e)	60 – '50' (= 10)		3	M1 may be seen embedded as $\frac{10}{60}$ $(=\frac{1}{6})$ oe (eg reading of 50 from graph stated or indicated by marks on vertical axis that correspond to 64 on the horizontal axis). Allow 60 – '50' – 1 (= 9) oe
	$\frac{'10'}{60} \times \frac{'10'-1}{59}$			M1 for use of $\frac{n}{60} \times \frac{n-1}{59}$ with any integer *n* such that $2 \le n \le 59$
		$\frac{3}{118}$		A1 oe (accept 0.025 or better) Allow $\frac{6}{295}$ (= 0.02 or better) if using $\frac{9}{60} \times \frac{8}{59}$
				Total 8 marks

15	$n^2t^3 = 4d + t^3$	$n^2 = \frac{4d}{t^3} + 1$		4	M1 for multiplying by the denominator **or** for dividing the RHS by t^3
	$t^3\left(n^2 - 1\right) = 4d$ oe	$n^2 - 1 = \frac{4d}{t^3}$			M1 for isolating terms in t^3 **and** factorising the correct expression of the equation **or** for isolating the $\frac{4d}{t^3}$ term
	$t^3 = \frac{4d}{\left(n^2 - 1\right)}$ oe	$t^3 = \frac{4d}{\left(n^2 - 1\right)}$			M1 for making t^3 the subject
			$t = \sqrt[3]{\frac{4d}{\left(n^2 - 1\right)}}$		A1 oe eg. $t = \sqrt[3]{\frac{-4d}{\left(1 - n^2\right)}}$ or $t = \left(\frac{4d}{\left(n^2 - 1\right)}\right)^{\frac{1}{3}}$ SC B2 for $t = \sqrt[3]{\frac{4d}{\left(n^2 + 1\right)}}$
					Total 4 marks

16	$\frac{1}{2}\times 45\times 36\times \sin 'C'$ (= 405)	**alternative** $\frac{2\times 405}{36}(=22.5)$ **or** $\frac{2\times 405}{45}(=18)$		5	M1 correct substitution into the sine area formula, with their choice of symbol to represent *C*. **or** work out the perpendicular height with *BC* or *CD* as the base.
	$\sin 'C' = \left(\frac{405\times 2}{45\times 36}\right)\left('C' = 30\right)$ oe	$\sqrt{45^2 - 22.5^2}\left(=\sqrt{1518.75} = 38.97\right)$ or $\sqrt{36^2 - 18^2}\left(=\sqrt{972} = 31.17\right)$			M1 correct rearrangement to make sin *C* the subject **or** use Pythagoras with their found perpendicular height.
	$(BD =)\sqrt{45^2 + 36^2 - 2\times 45\times 36\times \cos '30'}$ $\left(=\sqrt{3321 - 3240\times \cos '30'}\right)$ $\left(=\sqrt{515.077...} = 22.695...\right)$	$\sqrt{('38.97' - 36)^2 + 22.5^2}\left(=\sqrt{515.077...}\right)$ or $\sqrt{('45' - 31.17)^2 + 18^2}\left(=\sqrt{515.077...}\right)$			M1 (dep on 1st M1, ft 30) correct expression for *BD* ft their *C* (must be less than 90°). **or** use Pythagoras to find an expression for *BD*.
	$\cos 'ABD' = \left(\frac{'22.695...'^2 + 19^2 - 28^2}{2\times '22.695...'\times 19}\right)$ leading to '*ABD*' = **or** $(BAD =)\cos^{-1}\left(\frac{28^2 + 19^2 - '22.695...'^2}{2\times 28\times 19}\right)$ (= 53.7…) **and** $\sin 'ABD' = \frac{\sin '53.7'}{'22.695...'}\times 28$ leading to '*ABD*' =				M1 for a complete method to find angle *ABD*
			83.9		A1 accept 83.85 – 83.9
					Total 5 marks

17	Line drawn at (2, 1) with a positive gradient that does not intersect the curve at any other point.		3	M1 for a tangent drawn at $x = 2$
				M1 (dep M1) for a correct method to work out the gradient of the tangent.
		1.5 to 3		A1 for 1.5 to 3 accept answers in the range 1.5 – 3 so long as a tangent at $x = 2$ has been drawn.
				Total 3 marks

18	$3y^2+7y+16=(2y-1)^2-(2y-1)$	$3\left(\frac{x+1}{2}\right)^2+7\left(\frac{x+1}{2}\right)+16=x^2-x$		5	M1 substitution of linear equation into quadratic.
	E.g. $y^2-13y-14\ (=0)$ oe $y^2-13y=14$	E.g. $x^2-24x-81\ (=0)$ oe $x^2-24x=81$			A1 (dep on M1) writing the correct quadratic expression in form $ax^2+bx+c\ (=0)$ allow $ax^2+bx=c$
	E.g. $(y-14)(y+1)\ (=0)$ or $(y=)\dfrac{-(-13)\pm\sqrt{(-13)^2-4\times1\times-14}}{2}$ or $\left(y-\frac{13}{2}\right)^2-\left(\frac{13}{2}\right)^2=14$ oe	E.g. $(x+3)(x-27)\ (=0)$ or $(x=)\dfrac{-(-24)\pm\sqrt{(-24)^2-4\times1\times-81}}{2}$ or $\left(x-\frac{24}{2}\right)^2-\left(\frac{24}{2}\right)^2=81$oe			M1 (dep on M1) for the first stage to solve their 3-term quadratic equation (allow one sign error and some simplification – allow as far as $\dfrac{13\pm\sqrt{169+56}}{2}$ or $\dfrac{24\pm\sqrt{576+324}}{2}$ or eg $\left(x-\frac{24}{2}\right)^2-225$ oe
	$(x=)\ 2\times'14'-1$ and $2\times'-1'-1$	$(y=)\ \dfrac{'27'+1}{2}$ and $\dfrac{'-3'+1}{2}$oe			M1 (dep on previous M1) may be implied by values of y or x that are consistent with a correct substitution.
			(27, 14) and (−3, −1)		A1 for both solutions dep on M2 Must be paired correctly. accept $x=27$, $y=14$ and $x=-3$, $y=-1$
					Total 5 marks

19	$(AC =)\ \sqrt{8^2+18^2}\left(=\sqrt{388}=2\sqrt{97}=19.697...\right)$ **or** $(CE =)\ \sqrt{8^2+18^2+12^2}\left(=\sqrt{532}=2\sqrt{133}=23.065...\right)$ oe		3	M1
	eg $\tan ECA=\left(\dfrac{12}{'\sqrt{388}'}\right)$ **or** $\sin ECA=\left(\dfrac{12}{'\sqrt{532}'}\right)$ **or** $\cos ECA=\left(\dfrac{'\sqrt{388}'}{'\sqrt{532}'}\right)$ **or** $\sin ECA=\dfrac{\sin 90\times 12}{'\sqrt{532}'}$ **or** $\cos ECA=\left(\dfrac{('\sqrt{388}')^2+('\sqrt{532}')^2-12^2}{2\times'\sqrt{388}'\times'\sqrt{532}'}\right)$ oe			M1 for a correct trig statement with *ECA* as the only unknown. NB allow use '*x*' or other variable in place of *ECA*.
		31.4		A1 allow 31.3 – 31.5
				Total 3 marks

20	$y=\frac{k}{\sqrt{x}}$ or $ky=\frac{1}{\sqrt{x}}$ or $x=pT^3$ or $y=\frac{k}{\sqrt{pT^3}}$ or $y=\frac{c}{\sqrt{T^3}}$ oe	**Alternative** $y^2T^3=n$ oe		4	M1 Constant of proportionality must be a symbol such as *k* or *p* or *c* or *n* $k\neq 1$, $p\neq 1$ and $c\neq 1$ and $n\neq 1$
	$c=8\times\sqrt{25^3}\,(=1000)$ oe	$n=8^2\times 25^3$ $(=1000000)$ oe			M1 dep M1 for rearranging for *c* or *n* with (y =) 8 and (T =) 25 substituted correctly into their equation
	$27=\frac{'1000'}{\sqrt{T^3}}$ and $T^3=\left(\frac{'1000'}{27}\right)^2$ oe $27=\frac{'1000'}{\sqrt{T^3}}$ and $T^{\frac{1}{2}}=\left(\frac{'1000'}{27}\right)^{\frac{1}{3}}$ oe	$T^3=\frac{'1000000'}{27^2}$ oe			M1 for substitution of *y* **and** a correct rearrangement for T^3 or $T^{\frac{1}{2}}$ or *T*.
			$\frac{100}{9}$		A1 oe eg $11\frac{1}{9}$ or $11.\dot{1}$ or 11.111(…)
					Total 4 marks

21	$\pi x^2 + 2\pi x \times 3x + \frac{1}{2} \times 4\pi x^2 = 81\pi$ oe or $9x^2 = 81$oe **or** $2\pi x \times 3x + \frac{1}{2} \times 4\pi x^2 = 81\pi$ oe or $8x^2 = 81$		6	M1 for setting up an equation (in a single variable ie *x* or *r*) for the total surface area of the shape **or** for the curved surface area.
	$(x =)\sqrt{\frac{81}{9}}(= 3)$			M1 solving their equation in the form $kx^2\pi = 81\pi$ (where *k* follows correctly from their surface area) to find *x*
	$\pi \times '3'^2 \times 3 \times '3' + \frac{1}{2} \times \frac{4}{3}\pi '3'^3$ oe (= 81π + 18π = 99π = 311.(017…))			M1 (indep) for substituting their value of *x* to find the volume of the shape.
	99π or 311.(017…)			A1
	$\frac{840}{'311'}$ (= 2.7….) oe			M1 (dep on the 3rd M) for using the formula for density
		aluminium		A1 for aluminium **and** correct working leading to 2.7
				Total 6 marks

22	(gradient $AB =$) $\frac{10 - -5}{p - -1}\left(= \frac{10+5}{p+1} = \frac{15}{p+1}\right)$ oe or (gradient $BC =$) $\frac{q - -5}{8 - -1}\left(= \frac{q+5}{8+1} = \frac{q+5}{9}\right)$ oe or (gradient $AC =$) $\frac{10-q}{p-8}$ oe **or** $\sqrt{(p - -1)^2 + (10 - -5)^2}$ or $(p - -1)^2 + (10 - -5)^2$ or $\sqrt{(8 - -1)^2 + (q - -5)^2}$ or $(8 - -1)^2 + (q - -5)^2$ or $\sqrt{(8-p)^2 + (q-10)^2}$ or $(8-p)^2 + (q-10)^2$ oe		5	M1 for finding the gradient of AB or BC or AC This may be seen embedded in $m_1 \times m_2 = -1$ **or** for finding the length of AB or BC or AC (or AB^2 etc)
	• '$\frac{15}{p+1}$' $\times$ '$\frac{q+5}{9}$' $= -1$ or '$\frac{15}{p+1}$' $= -$'$\frac{9}{q+5}$' or $9p + 15q = -84$ oe • '$\frac{10-q}{p-8}$' $= -\frac{6}{7}$ or $6p - 7q = -22$ oe • $(p - -1)^2 + (10 - -5)^2 + (8 - -1)^2 + (q - -5)^2 = (8-p)^2 + (q-10)^2$ or $18p + 30q = -168$ **Alternative for the second point** • $\frac{6}{7}p + 10 = -8 \times -\frac{6}{7} + q$ oe			M2 for two out of the three of: • using $m_1 \times m_2 = -1$ • using the gradient of AC to form an equation. • using Pythagoras theorem If not M2, then M1 for one of the equations. **Alternative for the second point** obtaining this equation by using $y = mx + c$ with coordinates of A and C separately, and then eliminating c)

	Elimination E.g. $54p + 90q = -504$ $54p - 63q = -198$ With subtraction **or** $153q = -306$ **or** $63p + 105q = -588$ $90p - 105q = -330$ With the operation of addition **or** $153p = -918$	Substitution E.g. $6\left(\frac{-84-15q}{9}\right) = -22$ or $6p - 7\left(\frac{-84-9p}{15}\right) = -22$ or $9\left(\frac{-22+7q}{6}\right) + 15q = -84$ or $9p + 15\left(\frac{6p+22}{7}\right) = -84$			M1 (dep M3) for correct method to eliminate one variable – multiplying one or both equations so the coefficient of x or y is the same in both, with the correct operation to eliminate one variable (condone one arithmetic error) **or** isolating p or q in one equation and substituting into the other (condone one arithmetic error).
			$p = -6$ and $q = -2$		A1 for $p = -6$ and $q = -2$ Must be clearly identified
					Total 5 marks

23	$x^2 - 12x + 25$		4	M1 for substituting g(x) into f(x)
	$(x-6)^2 - 6^2$ (+ 25) **or** $(x-6)^2 - 11$ **or** $x^2 - 12x + (25 - y) = 0$ oe **or** $y^2 - 12y + (25 - x) = 0$ oe			M1 ft (dep on M1) for a correct first step in order to complete the square. Allow y in place of x. **or** Correctly setting up an equation = 0
	$(x-6)^2 = y + 11$ **or** $(y-6)^2 = x + 11$ **or** $x = \dfrac{12 \pm \sqrt{144 - 4(25 - y)}}{2}$ oe or $x = 6 \pm \sqrt{11 + y}$			M1 ft (dep on M2) for a correct rearrangement for their completed the square quadratic **or** correctly substituting into the quadratic formula (allow just + or just – instead of $\pm$) Allow same equations with x and y swapped
		$6 - \sqrt{11 + x}$		A1 oe must be in terms of x and have minus only before the square root.
				Total 4 marks