Question	Scheme	Marks
3(a)	$\left(y=\int\left(mx^2-10x-37\right)\mathrm{d}x=\right)\frac{mx^3}{3}-\frac{10x^2}{2}-37x\left(+c\right)$	M1
	$\left[\text{At } (1,20)\right]$	
	$20=\frac{m\times1^3}{3}-\frac{10\times1^2}{2}-37\times1+c\left(\Rightarrow 62=\frac{m}{3}+c\right)$ oe	dM1
	$\left[\text{Factor of } (x-5)\right]$	
	$0=\frac{m\times5^3}{3}-\frac{10\times5^2}{2}-37\times5+c\left(\Rightarrow 310=\frac{125m}{3}+c\right)\Rightarrow m=6 \qquad c=60$	M1 M1
	$\Rightarrow\left(\mathrm{g}(x)=\right)2x^3-5x^2-37x+60$ *	A1cso [5]
ALT	3rd and 4th method marks $(x-5)\left(\frac{m}{3}x^2+bx\mp\frac{c}{5}\right)=\frac{m}{3}x^3-5x^2-37x\pm c\Rightarrow m=6 \qquad c=60 \qquad (b=5)$	M1 M1
Special case up to SC3 – mark as M1dM1M1 M0A0 in Epen	Differentiates the given expression for g (x)correctly to give $2(3x^2)-5(2x)-37\left(=6x^2-10x-37\right)$ **and** concludes $m = 6$	SC1
	Correctly substitutes $x = 5$ into the given function and shows g (x) = 0 $\left(\mathrm{g}(5)=\right)2\times5^3-5\times5^2-37\times5+60=0$	SC1
	Correctly substitutes $x = 1$ into the given function and shows and g (x) = 20 $\left(\mathrm{g}(1)=\right)2\times1^3-5\times1^2-37\times1+60=20$	SC1
(b)	$x-5\overline{)2x^3-5x^2-37x+60}$ $\quad 2x^2+5x-12$	M1
	$2x^2+5x-12=\left(2x-3\right)\left(x+4\right)$	M1
	$\left(\mathrm{g}(x)=(x-5)(2x-3)(x+4)=[0]\right)$	
	$\Rightarrow x=5,\ \ \frac{3}{2},\ \ -4$	A1 [3]
		Total 8 marks

Part	Mark	Notes
(a)	M1	For a minimally acceptable attempt to integrate the given expression (see general guidance). No power of x to decrease. $+c$ is not required for this mark
	dM1	Correctly substitutes $x = 1$ and $y = 20$ to form an equation – simplification is not required Dependent on 1st method mark. A fully correct equation with no incorrect working can imply this mark. We will be lenient on not seeing the substitution of $x = 1$ as this is trivial, so long as the resulting equation is correct from their g (1) = 20. $+c$ is not required for this mark
	M1	Uses the information correctly that $(x – 5)$ is a factor of g (x) by correct substitution of $x = 5$ and $g(x) = 0$ into their g (x). Their g (x) **must** be a 4 term cubic expression. A fully correct equation with no incorrect working can imply this mark – but if the equation is incorrect we must see substitution of $x = 5$ such that $g(5) = 0$.
	M1	Uses a valid and complete method to solve their resulting simultaneous equations which must be in two variables. Allow up to 2 errors.
	A1 cso	For the correct function as shown or the correct expression. This is a show question. There must be no errors for the award of this mark.
ALT	3rd M1	Uses the information correctly that $(x – 5)$ is a factor of g (x) by writing a correct statement like the one shown for their g (x). Their g (x) **must** be a 4 term cubic expression.
	4th M1	Uses a valid and complete method to solve their resulting simultaneous equations in three variables. Allow up to 2 errors. It is not necessary to see the value for "b".
(b)	M1	For an attempt at polynomial division or equate coefficients to reach a 3 term quotient. The minimally acceptable quotient is $2x^2 \pm 5x \pm k \quad k \neq 0$ where k is a constant. In the absence of any other working, $2x^2 \pm 5x \pm k \quad k \neq 0$ may be accepted as evidence of working.
	M1	For attempting to factorise their quotient which must be of the form $2x^2 \pm 5x \pm k \quad k \neq 0$ - we must at least see a quadratic factor to factorise. See General Guidance for the definition of an attempt. It would also be possible to see a minimal attempt to use the quadratic formula or completing the square to solve (see general guidance) if their quadratic, of the form $2x^2 + 5x \pm k \quad k \neq 0$ does not factorise. If using the formula the substitution of their a, b and c must be completely correct.
	A1	For the correct values of x
Candidates have clearly been directed to use algebra in the question and therefore 0 marks can be scored without seeing M1 M1		