Question			Answer	Marks	AO	Guidance
5	(a)			M1*	1.1	Attempt to integrate given expression - must be three terms with at least two powers increased by 1 – ignore limits for first two marks. For reference. $\int_3^a \frac{1}{x^2}+\frac{11}{8}-\frac{1}{2}x\,\mathrm{d}x$
			$-\frac{1}{x}+\frac{11}{8}x-\frac{1}{4}x^2$	A1	1.1	Correct integrated expression. Allow in unsimplified form. Ignore $+c$.
			$\left(-\frac{1}{a}+\frac{11}{8}a-\frac{1}{4}a^2\right)-\left(-\frac{1}{3}+\frac{33}{8}-\frac{9}{4}\right)$	M1dep*	2.1	Correct use of limits of 3 and a in their integrated expression – accept $\pm(F(a)-F(3))$.
			$-\frac{1}{a}+\frac{11}{8}a-\frac{1}{4}a^2-\frac{37}{24}=-\frac{7}{24}$	M1	3.1a	Set $F(a)-F(3)=-\frac{7}{24}$ or $F(3)-F(a)=\frac{7}{24}$ - **dependent on both previous M marks**.
			$-\frac{24}{a}+33a-6a^2-30=0$ $6a^3-33a^2+30a+24=0$ $\Rightarrow 2a^3-11a^2+10a+8=0$	A1 [5]	1.1	**AG** – some intermediate working must be shown.
5	(b)		$(\mathrm{f}(-0.5)=)$ $2(-0.5)^3-11(-0.5)^2+10(-0.5)+8$	M1	1.1a	Consider either $\mathrm{f}(-0.5)$ or $\mathrm{f}(0.5)$ - use of long division is **M0.**
			$(=-0.25-2.75-5+8)=0$ so $(2a+1)$ is a factor (of $\mathrm{f}(a)$)	A1 [2]	2.4	**AG** so conclusion must be given. Condone using x instead of a.

Question			Answer	Marks	AO	Guidance
5	(c)		**DR**			
			$f(a) = (2a+1)(a^2 \pm ka + 8)$	**M1**	**1.1**	Correct linear factor and quadratic factor of the form $a^2 \pm ka + 8$ for any non-zero k. Allow repeated use of factor theorem, including the substitution, obtaining at least one more correct factor.
			$(2a+1)(a^2 - 6a + 8) = (2a+1)(a-4)(a-2)$	**A1**	**1.1**	Obtaining the factors $(a-4)$ and $(a-2)$. Condone omitting $(2a+1)$. Condone expressions in x for the first 2 marks.
			as $a > 3 \Rightarrow a = 4$	**A1** **[3]**	**2.3**	cao This must come from 3 correct factors seen in the working.