| Question | Scheme | Marks | AOs |
|---|---|---|---|
| 8 | $g'(x)=6x^2+5x+k \Rightarrow g(x)=2x^3+\frac{5}{2}x^2+kx+c$ | M1<br>A1 | 1.1b<br>1.1b |
| | Sets $"c"=-10$ | B1 | 1.1b |
| | Sets $g(-4)=0 \Rightarrow 2\times-64+\frac{5}{2}\times16-4k-10=0$ | M1 | 3.1a |
| | Solves linear equation in $k$ E.g. $2\times-64+\frac{5}{2}\times16-4k-10=0 \Rightarrow k=...$ | M1 | 1.1b |
| | $g(x)=2x^3+\frac{5}{2}x^2-\frac{49}{2}x-10$ | A1 | 2.1 |
| | | **(6)** | |
| | | | **(6 marks)** |
| **Notes:** | | | |

**M1:** Integrates $g'(x)$ with **two** correct indices. There is no requirement for the $+c$

Condone unprocessed terms for this mark. E.g $px^{2+1}$

**A1:** Fully correct integration. It may be unsimplified but the $+c$ must be seen (or implied by the $-10$)

**B1:** Sets the constant term = $-10$

**M1**: Dependent upon having done some correct integration (seen on at least one term).
It is for the setting up a linear equation in $k$ by using $g(-4)=0$

**M1:** Solves the linear equation in $k$.
It is dependent upon having attempted some integration and used $g(\pm4)=0$

**A1:** Accurate and careful work leading to $g(x)=2x^3+\frac{5}{2}x^2-\frac{49}{2}x-10$ or exact simplified equivalent

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It is possible to use the information about the factor first.

**M1A1:** Deduces $g(x)=(x+4)(Ax^2+Bx+C)$

**B1:** $g(x)=Ax^3+(4A+B)x^2+(4B+C)x+4C$ and deduces $C=-\frac{5}{2}$ (as intercept is $-10$)

**M1:** Differentiates $g'(x)=3Ax^2+2(4A+B)x+(4B+C)$ and compares to $g'(x)=6x^2+5x+k \Rightarrow A=...$

**M1:** Full method to get $A$, $B$ and $C$

**A1:** Accurate and careful work leading to $g(x)=(x+4)\left(2x^2-\frac{11}{2}x-\frac{5}{2}\right)$

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