Question Number	Scheme	Marks
1	$f(x)=ax^3+3x^2-8x+2$	
	Sets $f(2)=3\Rightarrow 8a+12-16+2=3$	M1
	$\Rightarrow 8a=5\Rightarrow a=\frac{5}{8}$	M1A1
		(3)
		(3 marks)

M1: Attempts to set $f(2)=3$. The values embedded and the expression set equal to 3 is sufficient. May be implied by further work. If 2 embedded in the expression is not seen, condone slips in their evaluation provided there is still evidence that the intention was to substitute in 2.
May also be seen as $\left(f(2)-3=\right)\ a(2)^3+3(2)^2-8(2)-1=0$

M1: Solves a linear equation in a arising from setting $f(\pm 2)=\pm 3$. Condone slips in their rearrangement proceeding to $a=...$ (May be implied by further work).

A1: $a=\frac{5}{8}$ or exact equivalent

Answers of $a=\frac{5}{8}$ may appear with very little or no working, possibly via trial and improvement. If so, then marks can only be allocated if evidence is shown.

e.g. $f(x)=\frac{5}{8}\times x^3+3x^2-8x+2\Rightarrow\ f(2)=5+3(2)^2-8(2)+2=3\Rightarrow$ dividing by $(x-2)$ gives a remainder of 3

More difficult alternative methods may be seen:

Alt I: e.g. algebraic division (note they may also divide ax^3+3x^2-8x-1 by $(x-2)$ and set the remainder equal to 0)

$$\begin{array}{r|l} & ax^2+(3+2a)x+(-2+4a) \\ \hline x-2 & ax^3\quad +3x^2\quad -8x\quad +2 \\ & ax^3\quad -2ax^2 \\ & \quad (3+2a)x^2\quad -8x \\ & \quad (3+2a)x^2+(-6-4a)x \\ & \qquad\qquad (-2+4a)x\quad +2 \\ & \qquad\qquad (-2+4a)x\quad +4-8a \\ & \qquad\qquad\qquad\quad -2+8a\Rightarrow -2+8a=3\Rightarrow a=\frac{5}{8} \end{array}$$

M1: Divides the cubic by $(x-2)$, leading to a quadratic quotient where both the coefficient of x and the constant term are in terms of a. They should then have a linear remainder in a which is then set equal to 3

M1: Solves an equation resulting from setting a linear remainder in a equal to ± 3. It is dependent on the first method mark via this route.

A1: Completely correct with $a=\frac{5}{8}$
