

1.

$$x + 2x^{\frac{3}{2}} + x^{-1} + C \quad \text{A1: } x + C, \text{ A1: } 2x^{\frac{3}{2}}, \text{ A1: } x^{-1} \quad \left| \text{M1 A1 A1 A1(4)} \right.$$

2.

$$\left| \begin{array}{l} \frac{2x^3}{3} - \frac{6x^{-2}}{-2} + C \\ \\ \left(= \frac{2x^3}{3} + 3x^{-2} + C \right) \end{array} \right. \quad \begin{array}{l} \text{M1: } x^2 \rightarrow x^3 \text{ or } x^{-3} \rightarrow x^{-2} \text{ or } + C \\ \\ \text{First A1: } \frac{2x^3}{3} + C \\ \\ \text{Second A1: } -\frac{6x^{-2}}{-2} \end{array} \quad \left| \begin{array}{l} \text{M1 A1 A1} \\ \\ \\ \end{array} \right. \quad (3)$$

3.

(a) $(4 + 3\sqrt{x})(4 + 3\sqrt{x})$ seen, or a numerical value of k seen, ($k \neq 0$).
 (The k value need not be explicitly stated... see below).
 $16 + 24\sqrt{x} + 9x$, or $k = 24$ M1

(b) $16 \rightarrow cx$ or $kx^{\frac{1}{2}} \rightarrow cx^{\frac{3}{2}}$ or $9x \rightarrow cx^2$ A1 cso (2)

$$\int (16 + 24\sqrt{x} + 9x) dx = 16x + \frac{9x^2}{2} + C, + 16x^{\frac{3}{2}}$$
M1
A1, A1ft (3)

4.

$$3x^2 \rightarrow kx^3 \text{ or } 4x^5 \rightarrow kx^6 \text{ or } -7 \rightarrow kx \quad (k \text{ a non-zero constant}) \quad \left| \text{M1} \right.$$

$$\frac{3x^3}{3} \text{ or } \frac{4x^6}{6} \quad (\text{Either of these, simplified or unsimplified}) \quad \left| \text{A1} \right.$$

$$x^3 + \frac{2x^6}{3} - 7x \text{ or equivalent unsimplified, such as } \frac{3x^3}{3} + \frac{4x^6}{6} - 7x^1 \quad \left| \text{A1} \right.$$

$$+ C \quad (\text{or any other constant, e.g. } + K) \quad \left| \text{B1} \right. \quad (4)$$

4

5.

$$\left| \begin{array}{l} (I =) \frac{12}{6}x^6 - \frac{8}{4}x^4 + 3x + c \\ = 2x^6 - 2x^4 + 3x + c \end{array} \right. \quad \left| \begin{array}{l} \text{M1} \\ \text{A1A1A1} \end{array} \right. \quad \left[4 \right]$$

6.

$$\left(\int =\right) \frac{12x^6}{6}, -\frac{3x^3}{3}, +\frac{4x^{\frac{4}{3}}}{\frac{4}{3}}, (+c)$$

$$= \underline{2x^6 - x^3 + 3x^{\frac{4}{3}} + c}$$

M1A1,A1,A1

A1

5

7,

$$\frac{x^5}{5} + 4x^{\frac{3}{2}} + C$$

M1A1A1

(3)

8.

$$\left(\frac{dy}{dx} =\right) -x^3 + "2"x^{-2} - "\left(\frac{5}{2}\right)"x^{-3}$$

$$(y =) -\frac{1}{4}x^4 + \frac{"2"x^{-1}}{(-1)} - "\left(\frac{5}{2}\right)"\frac{x^{-2}}{(-2)} (+c)$$

$$(y =) -\frac{1}{4}x^4 + \frac{2x^{-1}}{(-1)} - \frac{5}{2}\frac{x^{-2}}{(-2)} (+c)$$

Raises power correctly on any one term.
Any two follow through terms correct.

This is not follow through – must be correct

M1

M1

A1ft

A1

Given that $y = 7$, at $x = 1$, then $7 = -\frac{1}{4} - 2 + \frac{5}{4} + c \Rightarrow c =$

M1

So, $(y =) -\frac{1}{4}x^4 - 2x^{-1} + \frac{5}{4}x^{-2} + c, c=8$ or $(y =) -\frac{1}{4}x^4 - 2x^{-1} + \frac{5}{4}x^{-2} + 8$

A1

[6]