Question Number	Scheme	Marks
4	$\int \frac{3x^{\frac{3}{2}}-15x^{\frac{1}{2}}+2x-10}{4\sqrt{x}}\,\mathrm{d}x = \int \frac{3}{4}x-\frac{15}{4}+\frac{1}{2}x^{\frac{1}{2}}-\frac{5}{2}x^{-\frac{1}{2}}\,\mathrm{d}x$	M1A1A1
	$x^n \to x^{n+1}$	dM1
	$\frac{3}{8}x^2-\frac{15}{4}x+\frac{1}{3}x^{\frac{3}{2}}-5x^{\frac{1}{2}}+C$	A1A1
		(6 marks)

M1 Attempts to write as a sum of terms using correct index laws at least once.
Award for any term with a correct index.
Score for any one of:

$\frac{"3x^{\frac{3}{2}}"}{4\sqrt{x}} \to ...x$ $\frac{"-15x^{\frac{1}{2}}"}{4\sqrt{x}} \to \text{const}$ $\frac{+"2x"}{4\sqrt{x}} \to ...x^{\frac{1}{2}}$ $\frac{"-10"}{4\sqrt{x}} \to ...x^{-\frac{1}{2}}$

Cannot be scored for a term with a correct index arising from incorrect work

eg $\frac{"-10"}{4\sqrt{x}} \to ...x^{\frac{1}{2}}$

A1 Two correct terms of $\frac{3}{4}x$ $-\frac{15}{4}$ $+\frac{1}{2}x^{\frac{1}{2}}$ $-\frac{5}{2}x^{-\frac{1}{2}}$ (oe). They do not need to be seen on the same line for this mark and they do not need to be simplified. Eg $\frac{3}{4}x^1$, $\frac{-10x^{-\frac{1}{2}}}{4}$ are acceptable.

Indices must be processed though. Eg $\frac{3x^{\frac{3}{2}}}{4\sqrt{x}} \to \frac{3}{4}x^{1.5-0.5}$ is not acceptable.

A1 All four correct terms of $\frac{3}{4}x-\frac{15}{4}+\frac{1}{2}x^{\frac{1}{2}}-\frac{5}{2}x^{-\frac{1}{2}}$ (oe) Terms do not need to be simplified for this mark and do not need to be on one line.

dM1 Increases the power of any of their terms by 1. ($x^n \to x^{n+1}$). It is dependent on the first method mark.

A1 Any two terms correct unsimplified (see below) but the indices must be processed. Condone $-\frac{15}{4}x^1$ as a correct term for this mark only.

A1 $\frac{3}{8}x^2-\frac{15}{4}x+\frac{1}{3}x^{\frac{3}{2}}-5x^{\frac{1}{2}}+C$ o.e. all on one line (including the constant C and all simplified).

Do not accept $-\frac{15}{4}x^1$ as a correct simplified term.

Accept alternative correct simplified forms such as $\frac{3}{8}x^2-\frac{15}{4}x+\frac{1}{3}x^{\frac{3}{2}}-5\sqrt{x}+C$ or $\frac{3}{8}x(x-10)+\frac{1}{3}x^{\frac{1}{2}}(x-15)+C$

Question Number	Scheme	Marks
5(a)	$P_B - P_A = 44.2 - \left(53 - 0.4\times 8^2\right) = \ldots$ awrt (£) 16.8 million	M1 A1
		(2)
(b)	(£) 53 (million)	B1
		(1)
(c)	$-1.6t + 44.2 = 53 - 0.4(t-8)^2$ $\Rightarrow 0.4t^2 - 8t + \frac{84}{5} = 0 \Rightarrow t = \ldots$ $t = 10 - \sqrt{58} =$ awrt 2.38 (years) "2.38" $< t \left(\leqslant 15\right)$	M1 M1 A1 A1ft
		(4)
(d)	"The **share value** would be negative" / "the **model** is known to hold for 15 years only (and 20 years is more than 15)."	B1
		(1)
		(8 marks)

(a)

M1 Substitutes $t = 0$ into the equation for P_A and finds the difference between 44.2 and P_A.

A1 awrt (£) 16.8 million.

(b)

B1 (£) 53 million. Condone 53

(c)

M1 Sets $-1.6t + 44.2 = 53 - 0.4(t-8)^2$ They may have already attempted to multiply out $(t-8)^2$ so condone errors that may occur before setting $P_A = P_B$. Also may score for use of any inequality sign.

M1 Rearranges the equation to form a 3TQ on one side of the equation (= 0) or inequality and attempts to solve the quadratic. Condone slips in their working. See general rules for solving a quadratic. They may use a calculator to state the root(s) which is acceptable.

A1 awrt 2.38 (years) o.e. isw after a correct answer

A1ft "2.38" $< t \left(\leqslant 15\right)$ oe from correct working. You may follow through on their value of t provided $t < 15$. Ignore any reference to an upper limit provided it is $\geqslant 15$