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 $\geqslant 15$

You may see eg $10-\sqrt{58} < t < 10+\sqrt{58}$ which can score this mark.

(d)

B1 "The **share value (or *P*)** would be negative" or "the **model** is known to hold for 15 years only (and 20 is greater than 15)" or equivalent explanations.
Eg "*P* must be greater than (or equal to) zero".

Note "$-4.6 < 0$" is insufficient (it does not refer to the **model** or the **share value** of ***P***)

Question Number	Scheme	Marks
6(a)	$\mathrm{f}'(8)=\dfrac{32}{3\times 8^2}+3-2\sqrt[3]{8}\quad\left(=-\dfrac{5}{6}\right)$	M1
	$y-2="-\dfrac{5}{6}"(x-8)$	dM1
	$y=-\dfrac{5}{6}x+\dfrac{26}{3}$	A1
		(3)
(b)	$\mathrm{f}'(x)=\dfrac{32}{3x^2}+3-2\sqrt[3]{x}=...x^{-2}+3+...x^{\frac{1}{3}}$	
	$x^{-2}\to x^{-1},\ 3\to 3x,\ x^{\frac{1}{3}}\to x^{\frac{4}{3}}$	M1
	$\mathrm{f}(x)=\int\dfrac{32}{3}x^{-2}+3-2x^{\frac{1}{3}}\mathrm{d}x=-\dfrac{32}{3}x^{-1}+3x-\dfrac{3}{2}x^{\frac{4}{3}}+c$	A1A1
	$2=-\dfrac{32}{3}\times 8^{-1}+3\times 8-\dfrac{3}{2}\times 8^{\frac{4}{3}}+c\Rightarrow c=...$	dM1
	$\left(\mathrm{f}(x)=\right)\ -\dfrac{32}{3}x^{-1}+3x-\dfrac{3}{2}x^{\frac{4}{3}}+\dfrac{10}{3}$	A1
		(5)
		(8 marks)

Ignore labelling of parts (a) and (b)

(a)

M1 Substitutes $x=8$ to find a value for $\mathrm{f}'(8)$. Condone slips in their substitution and $-\dfrac{5}{6}$ seen will imply this mark.

dM1 It is for the method of finding a line passing though $(8,2)$ using their value for $\mathrm{f}'(8)$. Score for $(y-2)="-\dfrac{5}{6}"(x-8)$ with both brackets correct. If they use $y=mx+c$ they must proceed as far as $c=\ldots$ It is dependent on the previous method mark.

A1 $y=-\dfrac{5}{6}x+\dfrac{26}{3}$

(b)