1	**(i)**	State or imply equation $(3x+4)^2=(3x-11)^2$ or $3x+4=-(3x-11)$	B1	
		Attempt solution of 'quadratic' equation or linear equation	M1	
		Obtain $x=\frac{7}{6}$ or equivalent (and no other solutions)	A1	[3]
	(ii)	Use logarithms to solve equation of form $2^y=$ their answer to (i) (must be + ve)	M1	
		Obtain 0.222 (and no other solutions)	A1	[2]
2		State or imply that $\ln y=\ln A+p(x-1)$	B1	
		Equate gradient to p or obtain two equations for $\ln A$ and p	M1	
		Obtain $p=0.44$	A1	
		Substitute values correctly, to find value of $\ln A$	DM1	
		Obtain $A=3.2$	A1	[5]
		Alternative:		
		Obtain an equation either $e^{1.6}=Ae^p$ or $e^{2.92}=Ae^{4p}$	M1	
		Obtain both equations correctly	A1	
		Solve to obtain $p=0.44$	A1	
		Substitute value correctly to find A	DM1	
		Obtain $A=3.2$	A1	[5]
3		Differentiate to obtain form $p\cos x+q\sin 2x$ or equivalent	M1	
		Obtain correct $6\cos x+4\sin 2x$ or equivalent	A1	
		Substitute $\frac{1}{6}\pi$ to obtain derivative equal to $5\sqrt{3}$ or 8.66	A1	
		Form equation of tangent (not normal) using numerical value of gradient obtained by differentiation	M1	
		Obtain $y=8.66x-2.53$ cao	A1	[5]
4	**(i)**	Substitute $x=-2$ in $f(x)$ and equate to zero to obtain $-8+4a+b=0$ or equiv	B1	
		Substitute $x=-1$ in $g(x)$ and equate to -18	M1	
		Obtain $-1+b-a=-18$ or equivalent	A1	
		Solve a pair of linear equations for a or b	DM1	
		Obtain $a=5$, $b=-12$	A1	[5]
	(ii)	Simplify $g(x)-f(x)$ to obtain form kx^2+c where $k<0$	M1	
		Obtain $-17x^2+7$ and state 7, following their value of c	A1√	[2]

5 **(i)** Obtain integral of form $ke^{\frac{1}{2}x} + mx$ M1

Obtain correct $6e^{\frac{1}{2}x} + x$ A1

Apply limits and obtain correct $6e^{\frac{1}{2}a} + a - 6$ A1

Equate to 10 and introduce natural logarithm correctly DM1

Obtain given answer $a = 2\ln\left(\frac{16-a}{6}\right)$ correctly A1 [5]

(ii) Use the iterative formula correctly at least once M1

Obtain final answer 1.732 A1

Show sufficient iterations to justify accuracy to 3 d.p. or show sign change in interval (1.7315, 1.7325) A1 [3]

6 **(i)** State or imply $\text{cosec}\, 2\theta = \dfrac{1}{\sin 2\theta}$ B1

Express left-hand side in terms of $\sin\theta$ and $\cos\theta$ M1

Obtain given answer $\sec^2\theta$ correctly A1 [3]

(ii) **(a)** State or imply $\cos\theta = \dfrac{1}{\sqrt{5}}$ or $\tan\theta = 2$ at least B1

Obtain 1.11 or awrt 1.11, allow 0.353π B1

Obtain 2.03 or awrt 2.03 , allow 0.648π and no other values between 0 and π B1 [3]

(b) State integrand as $\sec^2 2x$ B1

Integrate to obtain expression of form $k\tan mx$ M1

Obtain correct $\frac{1}{2}\tan 2x$ A1

Obtain $\frac{1}{2}\sqrt{3}$ or exact equivalent A1 [4]

7 **(i)** Obtain $3y^2\dfrac{\mathrm{d}y}{\mathrm{d}x}$ as derivative of y^3 B1

Obtain $4y + 4x\dfrac{\mathrm{d}y}{\mathrm{d}x}$ as derivative of $4xy$ B1

Equate derivative of left-hand side to zero and solve for $\dfrac{\mathrm{d}y}{\mathrm{d}x}$, must be from implicit differentiation M1

Confirm given answer $\dfrac{\mathrm{d}y}{\mathrm{d}x} = -\dfrac{4y}{3y^2 + 4x}$ correctly A1 [4]

(ii) State or imply $y = 0$ B1

Substitute in equation of curve and show contradiction B1 [2]

(iii) State or imply $3y^2 + 4x = 0$ B1

Eliminate one variable from equation of curve using $3y^2 + 4x = 0$ M1

Obtain $y = -2$ A1

Obtain $x = -3$ A1 [4]