Question number	Scheme	Marks
8(a)	$x^3+3x^2y+3xy^2+y^3$	B1 [1]
(b)	$\alpha+\beta=-\frac{3}{2}$ **and** $\alpha\beta=\frac{4}{2}$ oe	B1
	$\alpha^3+\beta^3=(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)$	M1
	$\left("-\frac{3}{2}"\right)^3-3("2")\left("-\frac{3}{2}"\right)$ oe	dM1
	$\frac{45}{8}$ oe	A1 [4]
(c)	$\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}=$	
	$\frac{\alpha^3+\beta^3}{\alpha^2\beta^2}=\frac{\left("\frac{45}{8}"\right)}{"2"^2}$	M1
	$\frac{45}{32}$ oe	A1ft
	$\frac{\alpha}{\beta^2}\times\frac{\beta}{\alpha^2}=\frac{1}{\alpha\beta}=\frac{1}{'2'}$	
	$\frac{1}{2}$ oe	B1ft
	$x^2-"\frac{45}{32}"x+"\frac{1}{2}"(=0)$	M1
	$32x^2-45x+16=0$ oe	A1 [5]
		Total 10 marks

Part	Mark	Additional Guidance
(a)	B1	For the correct expansion simplified or un-simplified. For example, allow $x^3+2x^2y+x^2y+xy^2+2xy^2+y^3$
(b)	B1	Product and sum both correct, written explicitly or used later in working.
	M1	An attempt to rearrange their expression from part (a) to achieve as a minimum $\alpha^3+\beta^3=(\alpha+\beta)^3\pm3\alpha\beta(\alpha+\beta)$ **Note:** Accept alternative algebraic arrangements of $\alpha^3+\beta^3$ but please check carefully that the algebra is correct.
	dM1	Substitution of **their** sum and product into an expression which must be of the form $(\alpha+\beta)^3\pm3\alpha\beta(\alpha+\beta)$ **Note:** If they substitute correctly into alternative arrangements check that they are correct.
	A1	For $\frac{45}{8}$ oe
(c)	M1	Correct algebra to obtain $\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}=\frac{\alpha^3+\beta^3}{\alpha^2\beta^2}$ **and** substitution of **their** values for the sum and product.
	A1ft	For $\frac{45}{32}$ oe **Note:** only follow through their values for product and sum into **correct algebra.**
	B1ft	For the correct algebra and substitution of their $\alpha\beta=2$ to obtain $\frac{\alpha}{\beta^2}\times\frac{\beta}{\alpha^2}=\frac{1}{\alpha\beta}=\frac{1}{'2'}$ ft their $\alpha\beta$
	M1	Use of their sum and product to correctly form an expression as shown, $x^2-"\frac{45}{32}"x+"\frac{1}{2}"(=0)$ Allow missing = 0 for this mark or even = y for this mark.
	A1	Correct equation or any multiple of it, for example , $64x^2-90x+32=0$ The coefficients, must be integers.
	ALT	Starts with $\left(x-\frac{\alpha}{\beta^2}\right)\left(x-\frac{\beta}{\alpha^2}\right)=0\Rightarrow x^2-x\left(\frac{\beta}{\alpha^2}+\frac{\alpha}{\beta^2}\right)+\frac{\beta}{\alpha^2}\times\frac{\alpha}{\beta^2}=0$
	M1	Correct algebra to obtain $\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}=\frac{\alpha^3+\beta^3}{\alpha^2\beta^2}$ **and** substitution of **their** values for the sum and product.
	A1ft	For $\frac{45}{32}$ oe **Note:** only follow through their values for product and sum into **correct algebra.**
	B1ft	For the correct algebra and substitution of their $\alpha\beta=2$ to obtain $\frac{\alpha}{\beta^2}\times\frac{\beta}{\alpha^2}=\frac{1}{\alpha\beta}=\frac{1}{'2'}$ ft their $\alpha\beta$
	M1	For $x^2-x\left('\frac{45}{32}'\right)+'\frac{1}{2}'=0$ Accept this expression on it's own or even = y for this mark
	A1	Correct equation or any multiple of it, for example , $64x^2-90x+32=0$ The coefficients, must be integers.