Topic	What students need to learn:		
	Content		Guidance
5 **Further calculus**	5.1	**Derive formulae for and calculate volumes of revolution.**	**Both** $\pi\int y^2\,\mathrm{d}x$ **and** $\pi\int x^2\,\mathrm{d}y$ **are required.** Students should be able to find a volume of revolution given either Cartesian equations or parametric equations.
	5.2	Evaluate improper integrals where either the integrand is undefined at a value in the range of integration or the range of integration extends to infinity.	For example, $\int_0^{\infty} \mathrm{e}^{-x}\,\mathrm{d}x,\ \int_0^2 \frac{1}{\sqrt{x}}\,\mathrm{d}x$
	5.3	Understand and evaluate the mean value of a function.	Students should be familiar with the mean value of a function f(x) as, $\frac{1}{b-a}\int_a^b \mathrm{f}(x)\,\mathrm{d}x$
	5.4	Integrate using partial fractions.	Extend to quadratic factors $ax^2 + c$ in the denominator

Topic	What students need to learn:		
	Content		Guidance
5 **Further calculus** *continued*	5.5	Differentiate inverse trigonometric functions.	For example, students should be able to differentiate expressions such as, $\arcsin x + x\sqrt{(1-x^2)}$ and $\frac{1}{2}\arctan x^2$
	5.6	Integrate functions of the form $(a^2 - x^2)^{-\frac{1}{2}}$ and $(a^2 - x^2)^{-1}$ and be able to choose trigonometric substitutions to integrate associated functions.	