Topic	What students need to learn:	
	Content	Guidance
8 **Hyperbolic functions**	8.1	Understand the definitions of hyperbolic functions sinh x, cosh x and tanh x, including their domains and ranges, and be able to sketch their graphs.	For example, cosh $x = \dfrac{1}{2}\left(e^x + e^{-x}\right)$
	8.2	Differentiate and integrate hyperbolic functions.	For example, differentiate tanh $3x$, $x\sinh^2 x$, $\dfrac{\cosh 2x}{\sqrt{(x+1)}}$

Topic	What students need to learn:		
	Content		Guidance
8 **Hyperbolic functions** *continued*	8.3	Understand and be able to use the definitions of the inverse hyperbolic functions and their domains and ranges.	$\operatorname{arsinh} x = \ln\left[x + \sqrt{x^2 + 1} \right]$ $\operatorname{arcosh} x = \ln\left[x + \sqrt{x^2 - 1} \right], \ x \geqslant 1$ $\operatorname{artanh} x = \dfrac{1}{2}\ln\left[\dfrac{1+x}{1-x} \right], \ -1 < x < 1$
	8.4	Derive and use the logarithmic forms of the inverse hyperbolic functions.	
	8.5	Integrate functions of the form $\left(x^2 + a^2\right)^{-\frac{1}{2}}$ and $\left(x^2 - a^2\right)^{-\frac{1}{2}}$ and be able to choose substitutions to integrate associated functions.	