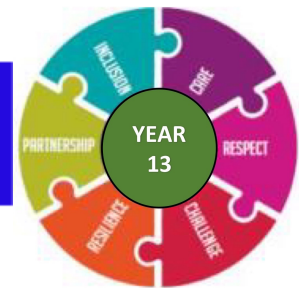
Year 13 Core Pure

integral FHS LEARNING JOURNEY

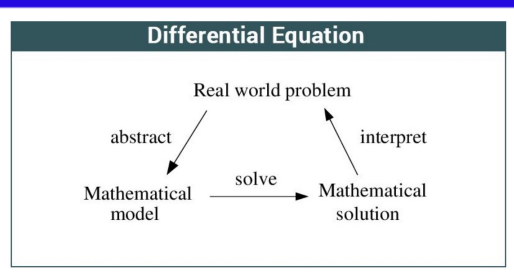


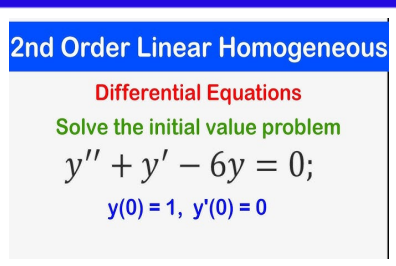


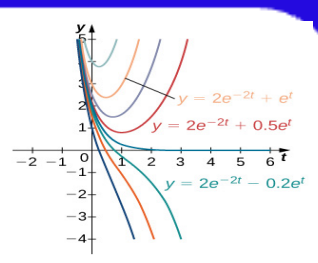






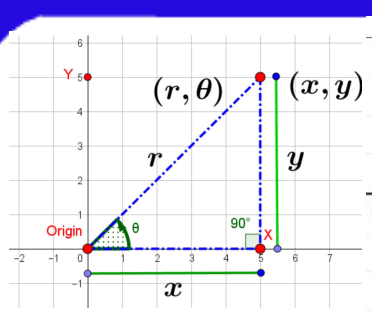


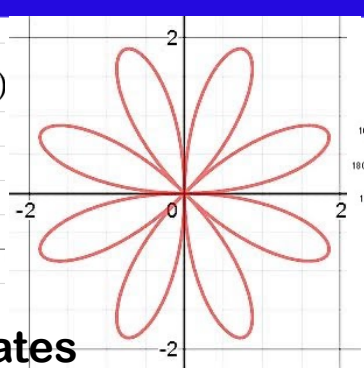


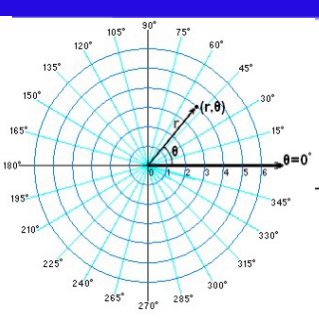


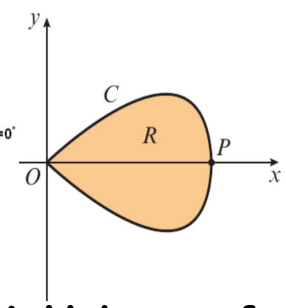
8. Modelling with differential equations

7. Methods in differential equations









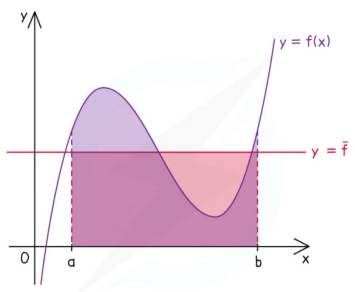


5. Polar coordinates

4. Volume of revolution

$$\therefore \int \frac{1}{\sqrt{x^2+a^2}}\,dx = \operatorname{arsinh}\left(\frac{x}{a}\right)+c$$

$$\therefore \int \frac{1}{a^2+x^2}\,dx = \frac{1}{a}\arctan\left(\frac{x}{a}\right)+c$$





3&6b. Method in calculus

6a. Hyperbolic functions

Maclaurin's Theorem

$f(x) = f(0)+xf'(0)+x^2/2!f''(0)...$



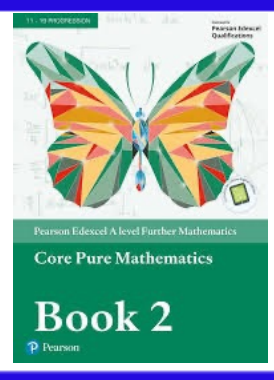
2. Series

$$\forall x \in \mathbb{R}$$
$$\cos(x) = \frac{e^{ix}+e^{-ix}}{2}$$
$$\sin(x) = \frac{e^{ix}-e^{-ix}}{2i}$$
$$e^{i\pi} + 1 = 0$$



Abraham de Moivre

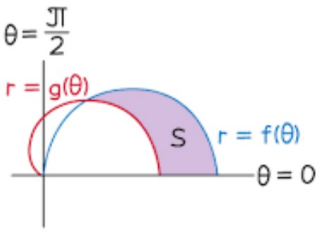
1.Complex numbers

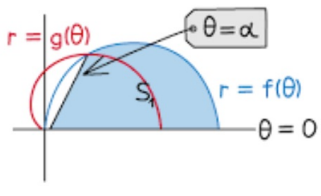


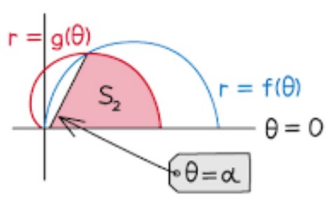


AREA OF S = AREA OF S_1 − AREA OF S_2

$\frac{1}{2}\int_0^{\alpha}[f(\theta)]^2 d\theta$ − $\frac{1}{2}\int_0^{\alpha}[g(\theta)]^2 d\theta$







AREA OF R = AREA OF R_1 + AREA OF R_2

$\frac{1}{2}\int_0^{\alpha}[g(\theta)]^2 d\theta$ + $\frac{1}{2}\int_{\alpha}^{\frac{\pi}{2}}[f(\theta)]^2 d\theta$

