Boundary Conditions

Example

Find $y$ in terms of $x$, given that $\frac{d^{2}y}{dx^{2}}-y=2e^{x}$, and that $\frac{dy}{dx}=0$ and $y=0$ at $x=0$.

Test Your Understanding

1. Find the value of $λ$ for which $y=λx\sin(5x)$ is a particular integral of the differential equation **(4 marks)**$$\frac{d^{2}y}{dx^{2}}+25y=3\cos(5x)$$
2. Using your answer to part (a), find the general solution of the differential equation **(3 marks)**
$$\frac{d^{2}y}{dx^{2}}+25y=3\cos(5x)$$

 (c) Given that at $x=0, y=0$ and $\frac{dy}{dx}=5$, find the particular solution to this differential equation, giving your solution in the form $y=f(x)$ **(5)**

(d) Sketch the curve with equation $y=f(x)$ for $0\leq x\leq π$ **(2)**

1. Find the general solution of the differential equation

$$\frac{d^{2}x}{dt^{2}}+5\frac{dx}{dt}+6x=2\cos(t)-\sin(t)$$

Ex7C/ D and Mixed Ex