

Problem Sheet 8

Deadline: **Monday 5 December, 5:00.**

Hand in to **the drop box** in the undergraduate common room (maths department, room 502).

Hand in the questions marked with an asterisk (*).

One mark will be deducted if you do not **staple your work.**

1) Solve the following second order ODEs.

a) $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0$

* d) $2\frac{d^2y}{dx^2} + 28\frac{dy}{dx} + 98y = 0$

* b) $\frac{d^2y}{dx^2} - 13\frac{dy}{dx} + 12y = 0$

* e) $\frac{d^2y}{dx^2} + 6\frac{dy}{dx} + 10y = 0$

* c) $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 0$

* f) $\frac{d^2y}{dx^2} + 8\frac{dy}{dx} + 25y = 0$

2) Solve the following second order ODEs. [Hint: Use your answers from question 1]

a) $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 18x^2$

* b) $\frac{d^2y}{dx^2} - 13\frac{dy}{dx} + 12y = 290 \sin x$

* c) $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = 2 \cos x$

* d) $2\frac{d^2y}{dx^2} + 28\frac{dy}{dx} + 98y = 98x - 196$

* e) $\frac{d^2y}{dx^2} + 6\frac{dy}{dx} + 10y = x^2 - 1$

* f) $\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 25y = 75$