**4.**

$$\frac{dy}{dx} = y^2 - x$$

(a) Show that

$$\frac{d^4y}{dx^4} = Ay\frac{d^3y}{dx^3} + B\frac{dy}{dx}\frac{d^2y}{dx^2}$$

where $A$ and $B$ are integers to be determined.

**(4)**

Given that $y = 1$ at $x = -1$

(b) determine the Taylor series solution for $y$, in ascending powers of $(x + 1)$ up to and including the term in $(x + 1)^4$, giving each coefficient in simplest form.

**(3)**

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

**Question 4 continued**

**(Total for Question 4 is 7 marks)**