

King Fahd University of Petroleum and Minerals

Department of Mathematical Sciences

Semester(Term 032) MATH 260 Quiz # 2

Name: Solution ID# \_\_\_\_\_ Section \_\_\_\_\_

Solve

$$(x+d_5)y' - 2y = d_3(x+d_5)^3 e^x, \text{ where } d_i = \begin{cases} i^{\text{th}} \text{ digit in your ID\# if } d_i \neq 0 \\ 1 + i^{\text{th}} \text{ digit in your ID\# if } d_i = 0 \end{cases}$$

$$y' - \frac{2}{(x+d_5)} y = d_3 (x+d_5)^2 e^x \quad (*) \quad (\text{Linear 1st-order DE})$$

$$\text{Integrating factor is } p(x) = e^{-\int \frac{2}{(x+d_5)} dx} = e^{-2 \ln|x+d_5|} = (x+d_5)^{-2}$$

Multiplying both sides of (\*) by  $p(x)$ , we get

$$\frac{d}{dx} [y (x+d_5)^{-2}] = d_3 e^x$$

Integrating we get,

$$y (x+d_5)^{-2} = d_3 e^x + C$$

The solution is

$$y = (x+d_5)^2 (d_3 e^x + C)$$