10. (CONT.)

$y' = 3x^2 e^{-x} - x^3 e^{-x}$

$= \underbrace{e^{-x}}_{P} \underbrace{(3x^2 - x^3)}_{Q}$

$P' = e^{-x} \cdot \frac{d}{dx}(-x)$

$P' = -e^{-x}$ $\qquad Q' = 6x - 3x^2$

$P'Q + PQ'$

$y'' = -e^{-x}(3x^2 - x^3) + e^{-x}(6x - 3x^2)$

$= e^{-x}(-3x^2 + x^3 + 6x - 3x^2)$

$= e^{-x}(x^3 - 6x^2 + 6x)$

$y'' = xe^{-x}(x^2 - 6x + 6)$

$x = 0$ ~~$e^{-x} = 0$~~ $x^2 - 6x + 6 = 0$

$a = 1 \quad b = -6 \quad c = 6$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(6)}}{2(1)}$

$= \frac{6 \pm \sqrt{36 - 24}}{2}$

$= \frac{6 \pm \sqrt{12}}{2}$

$= \frac{6 \pm 2\sqrt{3}}{2}$

$= 3 \pm \sqrt{3}$ → 4.7, 1.3