

Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. Make your work correct, complete and coherent.

Please take a picture of your quiz (for your records) just before you turn the quiz in. I will e-mail your grade and my comments to you. I will keep your quiz.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 7, November 15, 2023

Find one particular solution of

$$2y'' + 4y' + 7y = x^2.$$

Answer: We look for a solution of the form $y = Ax^2 + Bx + C$, for some numbers A , B , and C . We take derivatives of our candidate, plug these derivatives into the Differential Equation; and see what the constants A , B , and C must be. We see that

$$y' = 2Ax + B \quad \text{and} \quad y'' = 2A.$$

Plug the derivatives into the DE:

$$2(2A) + 4(2Ax + B) + 7(Ax^2 + Bx + C) = x^2$$

$$7Ax^2 + (8A + 7B)x + 4A + 4B + 7C = x^2.$$

We want

$$\begin{cases} 7A = 1 \\ 8A + 7B = 0 \\ 4A + 4B + 7C = 0 \end{cases}$$

Thus,

$$A = \frac{1}{7}, \quad B = \frac{-8}{49}, \quad \text{and} \quad C = \frac{-28 + 32}{343}$$

The function

$$y = \frac{1}{7}x^2 - \frac{8}{49}x + \frac{4}{343}$$

is a particular solution of the differential equation.