QUIZ 4

Each question is worth 10 points. Please write detailed mathematically correct solutions.

1. Using the table, find the Laplace transform of the following functions

a) $e^{-t}\cos 2t$

b) $e^{2t}(t-1)(t-2)$

c) $g(t) = \begin{cases} 1, & t \leq 1 \\ t+1, & 1 < t \end{cases}$

d) $u_2(t)e^{3t}$

2. Using the table, find the inverse Laplace transform of the following functions

a) $\dfrac{s+1}{s-4}$

b) $\dfrac{s+1}{s^2+4}$

c) $\dfrac{s+1}{s^2-4}$

d) $\dfrac{e^{-(s-1)}}{s}$

3. Solve the following IVP using Laplace transform

$$y'' + 2y' + y = 4e^t, \quad y(0) = 0, \quad y'(0) = 2$$

4. Solve the following IVP using Laplace transform

$$y'' + y = \begin{cases} 0, & t \leq 2\pi \\ 1, & 2\pi < t \end{cases}, \quad y(0) = 1, \quad y'(0) = 0$$

Plot the graph of your solution as best as you can.