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Assignment 1

1) A Dynamic equation can be defined as the differential equation in discrete time, continuous time and time scale calculus in combined discrete and continuous time

In Mathematics, it refers to

- Difference equation in discrete time e.g. Factorial $[n(n-1)!]$.

It refers to a special type of recurrence relation.

- Difference equation in continuous time e.g. equation of motion. It refers or relates to one or two functions to their derivatives

- Time scale calculus in combined discrete and continuous time e.g. partial differentiation.

2) $y = Ae^t$ --- (1) [Where A is a constant]
 $\frac{dy}{dt} = A \frac{d}{dt}(e^t) + e^t \frac{d}{dt}(A)$
 $\frac{dy}{dt} = Ae^t + Ae^t$ --- (2)

Make Ae^t the subject of formula from Equ (1)

$$y = Ae^t$$
$$\frac{y}{t} = Ae^t$$
 --- (3)

Put equ (1) and (3) into Equ (2)

$$\frac{dy}{dt} = Ae^t + Ae^t$$

$$\frac{dy}{dt} = y + \frac{y}{t}$$

$$t \frac{dy}{dt} = ty + y$$

$$t \frac{dy}{dt} = (t+1)y$$

$$t \frac{dy}{dt} - (t+1)y = 0$$