Homework 1

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a) Solve the following first order differential equation using the integration method :

1) $\frac{dx}{dt} = -2t \; ; x(0) = 5$

Answer :

$dx = -2t \; dt$

$x = \int -2t \; dt$

$x = -t^2 + C$

$x(0) = -0^2 + C = 5$

$= C = 5$

$x = -t^2 + 5$ //

2) $\frac{dx}{dt} = \sin 2t \; ; x(0) = -1$

Answer :

$dx = \sin 2t \; dt$

$x = \int \sin 2t \; dt$

$= \frac{1}{2}(-\cos 2t) + C$

$= -\frac{\cos 2t + c}{2}$

$x(0) = -\frac{\cos 2(0)}{2} + C = -1$

$= C = -\frac{1}{2}$

$x = -\frac{1}{2}\cos 2t - \frac{1}{2}$ //