1 hr : 3 qs, done in sun, xan ig 4:00

Separation of Variables

2.13) $\frac{dy}{dx} = \sec y \tan x$

$\frac{dy}{\sec y} = \tan x \, dx$

$\cos y \, dy = \frac{\sin x}{\cos x} dx$

$\int \cos y \, dy = -\int \frac{d(\cos x)}{\cos x}$

$\sin y = -\ln \cos x + c$

$\ln \cos x + \sin y = c$ //

Integrating factors

solve a:) $(y + x^4)dx - x\,dy = 0$

$y\,dx - x\,dy + x^4 dx = 0$

↳ $\frac{y\,dx - x\,dy}{x^2} + x^2 dx = 0$ → ingat identities $\frac{y\,dx - x\,dy}{x^2} = -d\left(\frac{y}{x}\right)$

↳ $-d\left(\frac{y}{x}\right) + x^2 dx = 0$

$-d\left(\frac{y}{x}\right) + d\left(\frac{x^3}{3}\right) = 0$

$d\left(-\frac{y}{x} + \frac{x^3}{3}\right) = 0$

$\frac{-y}{x} + \frac{x^3}{3} = c$ //

Linear equations

2.19) Solve $x\frac{dy}{dx} - 2y = x^3 \cos 4x$

↳ $x\frac{dy}{dx} = x^3 \cos 4x + 2y$

$\frac{dy}{dx} = x^2 \cos 4x + \frac{2y}{x}$

$\frac{dy}{dx} - \frac{2}{x}y = x^2 \cos 4x$

↳ ingat linear equation form

$\frac{dy}{dx} + Py = Q$

↳ $x^{-2}\frac{dy}{dx} - 2x^{-3}y = \cos 4x$

↳ $\frac{d}{dx}(x^{-2}y) = \cos 4x$

↳ after integrating $x^{-2}y = \frac{1}{4}\sin 4x + c$

$y = \frac{1}{4}x^2 \sin 4x + cx^2$ //