

Tugas 12 Nov 2020

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1) Tentukan persamaan garis singgung dan normal kurva

a) $y = \frac{1}{2}x^2 + 1$, $(1, \frac{1}{2})$

$$y' = 2 \cdot \frac{1}{2}x = x$$

$$m_1 = 1$$

$$m_2 = -1$$

$$y - \frac{1}{2} = 1(x - 1)$$

$$y - \frac{1}{2} = -1(x - 1)$$

$$y = x - \frac{1}{2}$$

$$y = -x + \frac{3}{2}$$

PGS $\Rightarrow y = x - \frac{1}{2}$

PGN $\Rightarrow y = -x + \frac{3}{2}$

b) $x^2 - xy^2 + 3y^2 = 18$, $P(2, 3)$

$$2x - (y^2 + 2xy \frac{dy}{dx}) + 6y \frac{dy}{dx} = 0$$

$$2x - y^2 = 2xy \frac{dy}{dx} - 6y \frac{dy}{dx}$$

$$\frac{dy}{dx} = \frac{2x - y^2}{2xy - 6y} = \frac{2 \cdot 2 - 3^2}{2 \cdot 2 \cdot 3 - 6 \cdot 3} = \frac{5}{6}$$

$$m_1 = 5/6$$

$$m_2 = -6/5$$

$$y - 3 = 5/6(x - 2)$$

$$y - 3 = -6/5(x - 2)$$

$$y = \frac{5x - 10}{6} + 3$$

$$y = \frac{-6x + 12}{5} + 3$$

$$y = \frac{5x + 8}{6}$$

$$y = \frac{-6x + 27}{5}$$

PGS $\Rightarrow y = \frac{5x + 8}{6}$

PGN $\Rightarrow y = \frac{-6x + 27}{5}$

2) Tentukan persamaan garis singgung dan garis normal fungsi parameter

a) $x = 4t - 3$ } $t = 2$ $\begin{cases} x = 5 \\ y = 4 \end{cases}$

$$\frac{dx}{dt} = 4t - 3$$

$$= 4$$

$$\frac{dy}{dt} = t^2$$

$$= 2t$$

$$= 04$$

$$\frac{dy}{dx} = 1$$

$$m_1 = 1$$

$$m_2 = -1$$

$$y - 4 = 1(x - 5)$$

$$y - 4 = -1(x - 5)$$

$$y = x - 1$$

$$y = -x + 9$$

PGS $\Rightarrow y = x - 1$

PGN $\Rightarrow y = -x + 9$

b) $x = \frac{t^2}{t+1}$ } $t = 1$ $\begin{cases} x = \frac{1}{2} \\ y = 0 \end{cases}$

$$y = \frac{t-1}{t+1}$$

$$\frac{dx}{dt} = \frac{t^2}{(t+1)^2}$$

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

$$= \frac{t^2 + 2t}{(t+1)^2}$$

$$\frac{dy}{dt} = \frac{t-1}{t+1}$$

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

$$= \frac{2}{(t+1)^2}$$

$$\frac{dy}{dx} = \frac{2}{t^2 + 2t} = \frac{2}{3}$$

$$m_1 = 2/3$$

$$m_2 = -3/2$$

$$y - 0 = \frac{2}{3}(x - \frac{1}{2})$$

$$y - 0 = -\frac{3}{2}(x - \frac{1}{2})$$

$$y = \frac{2}{3}(x - \frac{1}{2})$$

$$y = -\frac{3}{2}(x - \frac{1}{2})$$

PGS $\Rightarrow y = \frac{2}{3}(x - \frac{1}{2})$

PGN $\Rightarrow y = -\frac{3}{2}(x - \frac{1}{2})$