

Name: Paulus Abraham Mouny / form 240102116

① Dik: $y = x^2 - 4x \quad \Leftrightarrow x = -2, -1, 0, 1, 2$

$$m_{\text{tan}} = \frac{f(c+h) - f(c)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{f(c+h) - f(c)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{(c+h)^2 - 4(c+h) - (c^2 - 4c)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{c^2 + 2ch + h^2 - 4c - 4h - c^2 + 4c}{h}$$

$$= \lim_{h \rightarrow 0} \frac{2ch + h^2 - 4h}{h} = \lim_{h \rightarrow 0} \frac{h(2c + h - 4)}{h}$$

$$m_{\text{tan}} = \lim_{h \rightarrow 0} 2c + h - 4 = 2c - 4 //$$

$x = -2$	$\Leftrightarrow 2(-2) - 4 = -8$	\rightarrow titik koordinat $(-2, 8)$
$x = -1$	$\Leftrightarrow 2(-1) - 4 = -6$	\rightarrow titik koordinat $(-1, -6)$
$x = 0$	$\Leftrightarrow 2(0) - 4 = -4$	\rightarrow titik koordinat $(0, -4)$
$x = 1$	$\Leftrightarrow 2(1) - 4 = -2$	\rightarrow titik koordinat $(1, -2)$
$x = 2$	$\Leftrightarrow 2(2) - 4 = 0$	\rightarrow titik koordinat $(2, 0)$

②. Dik: $y = \frac{1}{x-1}$ titik $(0, -1)$

$$m_{tan} = \lim_{h \rightarrow 0} \frac{f(0+h) - f(0)}{h} = \lim_{h \rightarrow 0} \frac{f(0+h) - f(0)}{h}$$

$$= \lim_{h \rightarrow 0} \frac{f(h) - f(0)}{h} = \lim_{h \rightarrow 0} \frac{\frac{1}{h-1} + 1}{h}$$

$$= \lim_{h \rightarrow 0} \frac{\frac{1+h-1}{h-1}}{h} = \lim_{h \rightarrow 0} \frac{\frac{h}{h-1}}{h}$$

$$= \lim_{h \rightarrow 0} \frac{h}{h(h-1)} = \lim_{h \rightarrow 0} \frac{1}{h-1}$$

$$m_{tan} = \frac{1}{0-1} = -1$$

Senggan: $y - y_0 = m(x - x_0)$

$$y - (-1) = -1(x - 0)$$

$$y + 1 = -1(x - 0)$$

Nama: Paulus Abraham Mouny / NIM 240102116

③ a. $f(x) = (2x^2 + 3x)(x^3 - 4x + 3)$

mis: $u = 2x^2 + 3x$
 $u' = 4x + 3$

$v = x^3 - 4x + 3$
 $v' = 3x^2 - 4$

$$\begin{aligned} f'(x) &= u'v + uv' \\ &= (4x + 3)(x^3 - 4x + 3) + (2x^2 + 3x)(3x^2 - 4) \\ &= 4x^4 - 16x^2 + 12x + 3x^3 - 12x + 9 + 6x^4 - 8x^2 + 9x^3 - 12x \\ &= 10x^4 + 12x^3 - 24x^2 - 12x + 9 \end{aligned}$$

b. $f(x) = \frac{3x^2 + 2x - 4}{3x - 2}$

mis: $u = 3x^2 + 2x - 4$
 $u' = 6x + 2$

$v = 3x - 2$
 $v' = 3$

$$f'(x) = \frac{u'v - uv'}{v^2}$$

$$= \frac{(6x + 2)(3x - 2) - ((3x^2 + 2x - 4)(3))}{(3x - 2)^2}$$

$$= \frac{18x^2 - 12x + 6x - 4 - 9x^2 - 6x + 12}{(9x^2 - 12x + 4)}$$

$$f'(x) = \frac{9x^2 - 12x + 8}{9x^2 - 12x + 4}$$

$$(4) a, \int x^2 \sqrt{x^3+4} dx = \int (x^3+4)^{1/2} x^2 dx$$

$$\text{misal: } u = x^3 + 4 \text{ maka } \frac{du}{dx} = 3x^2 \Rightarrow du = 3x^2 dx$$

$$\Rightarrow \frac{1}{3} du = x^2 dx$$

$$\Rightarrow \int x^2 \sqrt{x^3+4} dx = \int u^{1/2} \cdot \frac{1}{3} du + C$$

$$\Rightarrow \frac{u^{3/2}}{3/2} \cdot \frac{1}{3} + C = \frac{u^{3/2}}{9/2} + C$$

$$\Rightarrow \frac{2(u)^{3/2}}{9} + C = \frac{2(x^3+4)^{3/2}}{9} + C //$$

$$b/ \int_1^8 \sqrt[3]{w} dw = \int_1^8 w^{1/3} dw$$

$$= \frac{w^{4/3}}{4/3} \Big|_1^8$$

$$= \frac{3(w)^{4/3}}{4} \Big|_1^8$$

$$\Rightarrow 3(w \cdot \sqrt[3]{w}) \Rightarrow 3(8)(\sqrt[3]{8})$$

$$= \frac{3(8)^{4/3}}{4} - \frac{3(1)^{4/3}}{4}$$

$$= \frac{3w \cdot \sqrt[3]{w}}{4}$$

$$= \frac{3(8) \cdot \sqrt[3]{8}}{4} - \frac{3(1) \cdot \sqrt[3]{1}}{4} = \frac{48}{4} - \frac{3}{4}$$

$$= \frac{45}{4} //$$