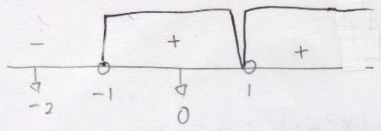
Nama : Yuli Nurhayati

PEMBAHASAN UTS MAT 1 2016-2017

1. a. $x^3 - x^2 - x + 1 > 0$

$(x-1)(x+1)(x-1) > 0$

$x = 1 \quad x = -1 \quad x = 1$



Hp $(-1, 1) \cup (1, \infty)$

atau

$-1 < x < 1$ & $x > 1$

b. $2(x-1)^2 - |x-1| \leq 1$

Lb $x-1$, untuk $x-1 \geq 0$ → $x-1$, untuk $x \geq 1$

$-(x-1)$ untuk $x-1 < 0$ → $-x+1$ untuk $x < 1$

untuk $x \geq 1$

$2(x-1)^2 - (x-1) \leq 1$

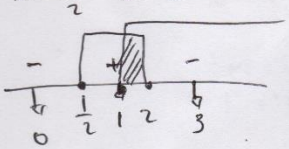
$2(x^2-2x+1) - x + 1 - 1 \leq 0$

$2x^2 - 4x + 2 - x \leq 0$

$2x^2 - 5x + 2 \leq 0$

$(2x-1)(x-2) \leq 0$

$x = \frac{1}{2} \quad x = 2$



Hp : $[1, 2]$ atau $\{1 < x < 2\}$

untuk $x < 1$

$2(x-1)^2 - (-x+1) \leq 1$

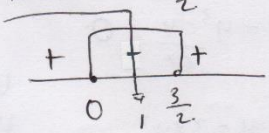
$2(x^2-2x+1) + x - 1 - 1 \leq 0$

$2x^2 - 4x + 2 + x - 2 \leq 0$

$2x^2 - 3x \leq 0$

$x(2x-3) \leq 0$

$x = 0 \quad x = \frac{3}{2}$



Hp $[0, 1)$ atau $\{0 < x < 1\}$

Hp = Hp1 ∪ Hp2

= $[1, 2] \cup [0, 1)$

= $[0, 2]$ //

2. a. $\lim_{x \to \infty} \sqrt[3]{\frac{1+8x^2}{x^2+4}}$

$= \lim_{x \to \infty} \sqrt[3]{\frac{\frac{1}{x^2} + \frac{8x^2}{x^2}}{\frac{x^2}{x^2} + 4}}$

$= \sqrt[3]{\frac{8}{1}}$

$= \sqrt[3]{8}$

$= 2$ //

b. $\lim_{x \to 2} \frac{t^3 - 8}{t - 2} = \frac{3t^2}{1}$

$= 3(2)^2$

$= 12$

kontinu karena $\lim_{x \to 2} = f(2)$

$12 = 12$ //

(3). a) $y' = 4\left(\frac{x^2+1}{\cos x}\right)^3 \cdot \frac{2x\cos x + x^2 \sin x + \sin x}{\cos^2 x}$

$u = x^2 + 1 \rightarrow u' = 2x$

$v = \cos x \rightarrow v' = -\sin$

$\frac{u' \cdot v - u \cdot v'}{v^2}$

$\frac{2x \cdot \cos x - (x^2+1) \cdot (-\sin x)}{\cos^2 x}$

$\frac{2x \cdot \cos x + x^2 \cdot \sin x + \sin x}{\cos^2 x}$

b) $x^3 y + y^3 x = 10$

$\frac{d\, x^3 y}{dy} + \frac{d\, y^3 x}{dy} - \frac{d\, 10}{dy} = 0$

$3x^2 \cdot y + x^3 \frac{dy}{dx} + 3xy^2 + y^3 \frac{dy}{dx} = 0$

$(x^3 + y^3)\frac{dy}{dx} = -3x^2 \cdot y - 3xy^2$

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

$\frac{dy}{dx}\Big|_{(1,2)}^{xy} = \frac{-3(1)^2(2) - 3(1)(2)^2}{1^3 + 2^3}$

$= \frac{-6 - 3(4)}{1+8}$

$= \frac{-6-12}{9}$

$= \frac{-18}{9}$

$= -2$

$x^3 \cdot y$

$u = x^3 \rightarrow u' = 3x^2$

$v = y \rightarrow v' = 1$

$u' \cdot v + u \cdot v' = 3x^2 \cdot y + x^3 \cdot 1$

$= 3x^2 \cdot y + x^3$

$u = y^3 \rightarrow u' = 3y^2$

$u = x \rightarrow u' = 1$

$u' \cdot v + u \cdot v'$

$3y^2 \cdot x + y^3 \cdot 1$

$y - y_1 = m(x - x_1)$

$y - 2 = -2(x - 1)$

$y - 2 = -2x + 2$

$y = -2x + 4$

(4) $v = x \cdot x \cdot t$

$12000 = x^2 \cdot t$

$t = \frac{12000}{x^2}$

$f(x) = x \cdot x + 2 \cdot x \cdot x + 4 \cdot x \cdot t$

$= 3x^2 + 4xt$

$= 3x^2 + 4\left(\frac{12000}{x^2}\right)$

$= 3x^2 + \frac{48000}{x}$

$6x^3 - 48000 = 0$

$x = 20 \rightarrow t = \frac{12000}{400} = 30$

$t = 30$

$x = 20$