1. Siakan palajari dan diskusikan materi dan soal-soal yang ada pada akhir materi yang terlampir pada FILE.

2. Kemudian jawaban dikrimkan sebelum batas waktu yang sudah ditentukan.

Nama : Andi Supriyadi
Angkatan : IV.

MID TEST MATEMATIKA TERAPAN

1. a. $f(x) = (2x^2-3)(2x^2-5x+7)$

$f(x) = 4x^4 - 10x^3 + 14x^2 - 6x^2 + 15x - 21 = 4x^4 - 10x^3 + 8x^2 + 15x - 21$

$f'(x) = 16x^3 - 30x^2 + 16x + 15$

b. $f(x) = \frac{2x-1}{3+x^2}$, misalkan $u : 2x-1$, $u' : 2$, $v : 3+x^2$, $v' = 2x$

$f'(x) : \frac{u}{v} : \frac{u'.v - v'.u}{v^2}$

$f'(x) : \frac{2.(3+x^2) - 2x.(2x-1)}{(3+x^2)^2} : \frac{6+2x^2-4x^2+2x}{9+6x^2+x^4} : \frac{-2x^2+2x+6}{x^4+6x^2+9}$

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

$f(x) : 3.(4x^2-16x+16) : 12x^2 - 48x + 48$

$f'(x) : 24x - 48$

d. $f(x) : 5\cos x - \frac{1}{2}x^2$

$f'(x) : -5\sin x - x$

2. a. $\int \frac{2x-1}{x^2}\,dx : \int \frac{2}{x} - \frac{1}{x^2}\,dx : \int 2x^{-1} - x^{-2}\,dx : 2\ln x + x^{-1} + C : 2\ln x + \frac{1}{x} + C$

b. $\int_0^4 (\sqrt{x} + \frac{1}{\sqrt{x}})\,dx : \int_0^4 (x^{\frac{1}{2}} + x^{-\frac{1}{2}})\,dx : [\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}}]_0^4 : [\frac{2}{3}.4^{\frac{3}{2}} + 2.4^{\frac{1}{2}}] - [\frac{2}{3}.0^{3/2} + 2.0^{\frac{1}{2}}]$

$\int_0^4 (\sqrt{x} + \frac{1}{\sqrt{x}})\,dx = (\frac{2}{3}.8 + 2.2) - (0+0) = \frac{16}{3} + 4 : \frac{28}{3} : 9\frac{1}{3}$

c. $\int x^2.\sin x^3\,dx$, misalkan $u : x^3$ $\frac{du}{dx} : 3x^2$, $dx = \frac{du}{3x^2}$

$\int x^2.\sin u\,\frac{du}{3x^2} = \frac{1}{3}\int \sin u\,du : -\frac{1}{3}\cos u + C : -\frac{1}{3}\cos x^3 + C$

d. $\int 3x(x^2+5)^5\,dx$; misalkan $u : x^2+5$, $\frac{du}{dx} = 2x$, $dx = \frac{du}{2x}$

$\int 3x(u)^5 \frac{du}{2x} = \frac{3}{2}.\frac{1}{6}u^6 + C : \frac{1}{4}(x^2+5)^6 + C$

3. Diketahui : $u_1 : a = 2$, $S_\infty = 4$

$S_\infty : \frac{a}{1-r}$, maka : $4 = \frac{2}{1-r}$, $4-4r = 2$, $4r : 4-2$, maka $r : \frac{2}{4} : \frac{1}{2}$

4. Diketahui = Deret : $1+4+16+64+\ldots$, maka $a=1$, $r\,4$

$S_n : \frac{a(r^n-1)}{r-1} \rightarrow \frac{1(4^n-1)}{4-1} > 1000 \rightarrow \frac{(4^n-1)}{3} > 1000 \rightarrow 4^n - 1 > 3000$ —

$4^n > 3001$

$\log 4^n > \log 3001 \rightarrow n \log 4 > \log 3001 \rightarrow n = \frac{\log 3001}{\log 4} = 5{,}775 \approx 6$

5. $f(x) = e^x \cdot \cos(x)$

$f(x) : e^x \cdot \cos(x) \longrightarrow f(0) = e^0 \cdot \cos(0) : 1 \longrightarrow f(c) \cdot e^c \cdot \cos(c)$

$f'(x) = e^x \cdot \cos(x) - e^x \cdot \sin(x) \longrightarrow f'(0) = e^0 \cdot \cos(0) - e^0 \cdot \sin(0) : 1 \longrightarrow f(c) : e^c \cdot \cos(c) - \sin(c)$

$f''(x) : e^x \cdot \cos(x) - e^x \sin x) - e^x \cdot \sin(x) - e^x \cdot \cos(x) = -2e^x \sin(x) \rightarrow f(0)'' : -2 \cdot 0 = 0 \rightarrow$

$f(c)'' : -2e^c \cdot \sin(c).$

$f'''(x) : -2e^x \cdot \sin(x) - 2e^x \cdot \cos(x) \longrightarrow f'''(0) : -2e^0 \cdot \sin(0) - 2e^0 \cdot \cos(0) : -2 \longrightarrow$

$f'''(c) : -2e^c \sin(c) - 2e^c \cdot \cos(c)$

$f^4(x) = -2e^x \cdot \sin(x) - 2e^x \cdot \cos(x) - 2e^x \cdot \cos(x) + 2e^x \cdot \sin(x)) : -4e^x \cdot \cos(x) \rightarrow f^4(0) = -4 \rightarrow$

$f^4(c) : -4e^c \cdot \cos(c)$

$f^5(x) : -4e^x \cdot \cos(x) + 4e^x \cdot \sin x) \longrightarrow f^5(0) : -4e^0 \cdot \cos(0) + 4 \cdot e^0 \cdot \sin(0) : -4 \rightarrow$

$f^5(c) : -4e^c \cdot \cos(c) + 4e^c \cdot \sin(c)$

sehingga deret Mc Laurin $\longrightarrow e^x \cdot \cos(x) = 1 + \frac{1}{1!} x + \frac{0}{2!} x^2 - \frac{2}{3!} - \frac{4}{4!} x^4 - \frac{4}{5!} x^5 + \ldots\ldots$

$e^x \cdot \cos(x) = 1 + x + -\frac{2}{3!} x^3 - \frac{4}{4!} x^4 - \frac{4}{5!} x^5 + \ldots\ldots$

Deret Taylor

$e^c \cdot \cos(c) + \frac{e^c \cdot \cos(c) - e^c \cdot \sin(c)}{1!}(x-c) - \frac{2e^c \cdot \sin(c)}{2!}(x-c)^2 - \frac{2e^c \cdot \sin(c) + 2e^c \cdot \cos(c)}{3!}(x-c)^3 -$

$\frac{4e^c \cdot \cos(c)}{4!}(x-c)^4 - \frac{4e^c \cdot \cos(c) - 4e^c \cdot \sin(c)}{5!}(x-c)^5$

NAMA : HENDI

① Deret Taylor dan Macluoren

a. - Deret macworen

$F(x) = \frac{1}{1+x}$ atau $F(x) = 1 \; (1+x)^{-1} \rightarrow$ misal $u = 1$; $u' = 0$

$F'(x) = 0 \; (1+x)^{-1} + 1 \; (-(1+x)^{-2}$ $\quad u = (1+x)^{-1}$

$v' = -(1+x)^{-2}$

$= 0 + (-(1+x)^{-2}$

$= -(1+x)^{-2} \rightarrow f'(0) = -1$

$F''(x) = 2(1+x)^{-3} \rightarrow f''(0) = 2$

$F'''(x) = -6(1+x)^{-4} \rightarrow F'''(0) = -6$

Sehingga $F(0) = 1 - x + \frac{2}{2!}x^2 - \frac{6}{3!}x^3 + \cdots$

$= 1 - x + \frac{2}{2}x^2 - \frac{6}{6}x^3 + \cdots$

$= 1 - x + x^2 - x^3 + \cdots$

② a) Deret macluoren

$- F(x) = \sin x$

$= \sin 0 + \frac{\cos 0}{1!}x + \frac{-\sin 0}{2!}x^2 + \frac{-\cos 0}{3!}x^3 + \frac{\sin 0}{4!}x^4 + \cdots$

$= 0 + x - 0 - \frac{x^3}{3!} + 0 + \cdots$

$= x - \frac{x^2}{3!} + \cdots$

$- F(x) = \cos x$

$= \cos 0 + \frac{-\sin 0}{1!}x + \frac{-\cos 0}{2!}x^2 + \frac{\sin 0}{3!}x^3 + \frac{\cos 0}{4!}x^4 + \cdots$

$= 1 + 0 - \frac{x^2}{2!} + 0 + \frac{x^4}{4!} + \cdots$

$= 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots$

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1 DERET TAYLOR.

$$f(x) = \frac{1}{1+x}$$

$$f(0) = \frac{1}{1+0}$$

$$= 1 \quad //$$

$$f(x) = \ln(1+x)$$

$$f(0) = \ln(1+0) \quad //$$

DERET TAYLOR

contoh: $f(x) = \cos x$

$$\cos(x) = \cos(a) - \frac{\sin(a)}{1!}(x-a) - \frac{\cos(a)}{2!}(x-a)^2 + \frac{\sin(a)}{3!}(x-a)^3 + \ldots$$

$$\cos(x) = 1 \frac{0}{1!}(x-0) \frac{1}{2!}(x-0)^2 + \frac{0}{3!}(x-0)^3 + \frac{1}{4!}(x-0)^4 + \ldots$$

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{4}{4!} - \ldots$$

contoh: $f(x) = \sin x$

$$= f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \frac{f^{(3)}(a)}{3!}(x-a)^3 + \ldots + \frac{f^{(n)}(a)}{n!}(x-a)^n + \ldots$$

$$\frac{1}{1-x} = \frac{1}{1-a} + \frac{x-a}{(1-a)^2} + \frac{(x-a)^2}{(1-a)^3} + \ldots$$

$$\cos x = \cos a - \sin a\,(x-a) - \frac{1}{2}\cos a(x-a^2) + \frac{1}{6}\sin a(x$$

$$e^x = e^a\left[1 + (x-a) + \frac{1}{2}(x-a)^2 + \frac{1}{6}(x-a)^3 + \ldots\right]$$

$$\ln x = \ln a + \frac{x-a}{a} - \frac{(x-a)^2}{2a^2} + \frac{(x-a)^3}{3a^3} - \ldots$$

$$\sin x = \sin a + \cos a(x-a) - \frac{1}{2}\sin a(x-a)^2 \frac{1}{6}\cos a(x-a)$$

DERET MACLOUREN :

$f(x) = \sin x$.

$f'(x) = \cos x$

$f''(x) = -\sin x$

$f'''(x) = -\cos x$

$f4\ (x) = \sin x$ dst.

jadi

$$\sin x = \sin 0 + \frac{\cos 0}{1!} x + \frac{-\sin 0}{2!} x^2 + \frac{-\cos 0}{3!} x^3 + \frac{\sin 0}{4!} x^4 + \cdots$$

$$= 0 + x - 0 - \frac{x^3}{3!} + 0 + \cdots$$

$$= x = \frac{x^3}{3!} + \cdots$$

DENGAN CARA YG SAMA.

$$\cos x = \cos 0 + \frac{-\sin 0}{1!} x + \frac{-\cos 0}{2!} x^2 + \frac{\sin 0}{3!} x^3 - \frac{\cos 0}{4!} x^4 + \cdots$$

$$= 1 + 0 - \frac{x^2}{2!} + 0 + \frac{x^4}{4!} + \cdots$$

$$= 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots$$

———o———