

## SKPB - ITS

## EVALUASI AKHIR SEMESTER BERSAMA GASAL 2023/2024

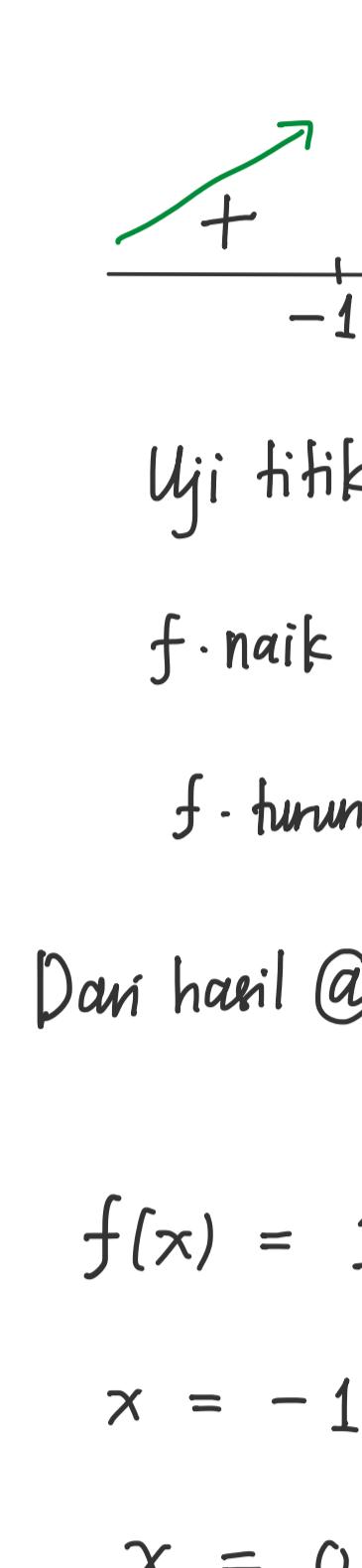
Mata Kuliah/SKS : Kalkulus 1 (SM234101) / 3 SKS  
 Hari, Tanggal : Selasa, 12 Desember 2023  
 Waktu : 13.30-15.10 WIB (100 menit)  
 Sifat : Tertutup  
 Kelas : 44-50

Diberikan 5 soal, dengan bobot nilai masing-masing soal sama dan boleh dikerjakan tidak berurutan.

Tuliskan Nama, NRP, dan Nomor Kelas pada lembar jawaban Anda.

**DILARANG MEMBAWA/MENGUNAKAN KALKULATOR DAN ALAT KOMUNIKASI**  
**DILARANG MEMBERIKAN/MENERIMAKAN JAWABAN SELAMA UJIAN**  
 "Setiap tindak kecurangan akan mendapat sanksi akademik."

1. Tangki air berbentuk kerucut dengan jari-jari alasnya 12 m dan tinggi kerucut 30 m. Jika air mengalir ke dalam tangki dengan laju  $24 \text{ m}^3/\text{menit}$ . Berapa cepat kedalaman air bertambah pada saat kedalaman air 20 m?



$$\begin{aligned} \text{Diketahui : } & r = 12 \text{ m} \\ & h = 30 \text{ m} \\ & \frac{dV}{dt} = 24 \text{ m}^3/\text{menit} \end{aligned}$$

$$\text{Ditanya : } \frac{dh}{dt} = ? \text{ saat } h = 20 \text{ m}$$

$$\text{Volume kerucut} = \frac{1}{3} \times \text{luas alas} \times \text{tinggi}$$

$$V = \frac{1}{3} \pi r^2 h$$

$$V = \frac{1}{3} \pi \cdot 12^2 \cdot h$$

$$V = \frac{144\pi}{3} \cdot h$$

$$V = 48\pi \cdot h$$

$$\Rightarrow \frac{d}{dt}[V] = \frac{d}{dt}[48\pi \cdot h]$$

$$\frac{dV}{dt} = 48\pi \cdot \frac{dh}{dt}$$

$$\frac{dh}{dt} = \frac{1}{48\pi} \cdot \frac{dV}{dt}$$

$$= \frac{1}{48\pi} \cdot 24$$

$$= \frac{1}{2\pi} \text{ m/menit}$$

2. Diberikan fungsi  $f(x) = 1 + 2x^2 - x^4$ .

(a) Tentukan selang dimana fungsi  $f(x)$  naik atau turun

(b) Tentukan titik ekstrim relatif fungsi tersebut

(c) Tentukan selang kecekungan fungsi  $f(x)$  dan titik belok (jika ada)

(d) Sketsa grafiknya.

$$f(x) = 1 + 2x^2 - x^4$$

$$\textcircled{a} f'(x) = 0$$

$$4x - 4x^3 = 0$$

$$4x(1 - x^2) = 0$$

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

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