

# Calculus I Mock Fall 2024: Amendments

Andrew Lam

1 Dec, 2024

*Note: This document is prepared for people who obtained a hard copy of their respective streams of mock papers on Friday.*

All Rights Reserved ©Andrew Lam 2024.

# Mock Follow-ups

- I could organize **individual 10-min Zoom meetings** to discuss your answers/ errors/ reminders, if you submit your paper.
- **Quota: 25 students for each stream.** First-come-first-served.
- Marking scheme would **NOT** be released; rather, it would be **went through with you together during the zoom meeting.**
- Please provide your reference number and SID when submitting the paper via the contact methods.

Paper submission deadlines are:

- 10/12/2024 (Tue) (MATH 1012/MATH 1013)
- 14/12/2024 (Sat) (MATH 1003)

# Section 1

## Amendments - MATH 1003

## Amend Choices:

- $u'(x) = 3 + \frac{4}{x^2} + \frac{15}{x^4}$
- $u'(x) = \frac{15x^4 + 12x^2 - 15}{x^5}$
- $u'(x) = 3 - \frac{4}{x^2} - \frac{15}{x^4}$
- $u'(x) = \frac{15x^4 - 12x^2 + 15}{x^5}$
- $u'(x) = 3 - \frac{4}{x} - \frac{15}{x^3}$

## Amend Choices:

- $1203 \cdot 5^{2023} \cdot 6^{1203}$
- $-2024 \cdot 5^{2023} \cdot 6^{1203}$
- $2024 \cdot 5^{2024} \cdot 6^{1202}$
- $-1203 \cdot 5^{2024} \cdot 6^{1202}$
- $1203 \cdot 5^{2024} \cdot 6^{1202}$

## Amend Question:

Which of the following is correct?

- $\frac{3x^2}{y^3} + \ln y + \left( \frac{x}{\ln 3} - \frac{3x^3}{y^4} \right) \frac{dy}{dx} = 0$
- $\frac{3x^2}{y^3} + \frac{\ln y}{\ln 3} + \left( \frac{x}{y \ln 3} - \frac{3x^2}{y^4} \right) \frac{dy}{dx} = 10$
- $\frac{3x^2}{y^3} + \frac{\ln y}{\ln 3} + \left( \frac{x}{y \ln 3} - \frac{3x^3}{y^4} \right) \frac{dy}{dx} = 0$
- $\frac{3x^2}{y^3} + \frac{1}{\ln 3} + \left( \frac{x}{y \ln 3} - \frac{x^3}{y^4} \right) \frac{dy}{dx} = 10$
- $\frac{3x^2}{y^3} + \frac{\ln y}{\ln 3} + \left( \frac{x \ln y}{y \ln 3} - \frac{3x^3}{y^4} \right) \frac{dy}{dx} = 0$

Change question and information:

- 400 km south  $\implies$  520 km south

- $t = 10$  hours  $\implies t = 13$  hours

- **Add part:**

(b) (2 pts) Use the information at  $t = 4$  hours to show that

$$a^2 + b^2 - 130a = 0$$

(c) Find the speeds of the two cars by constructing another equation on  $a$  and  $b$ . (6  $\rightarrow$  4 pts)

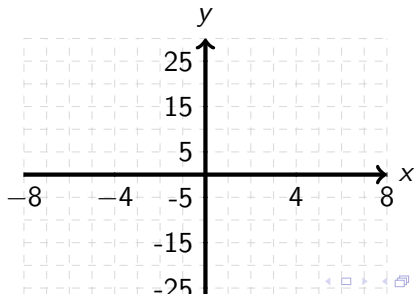
## Change Numbers:

- Given a function  $f(x) = \frac{x^3 + 5x^2}{(x-1)^2}$ , with first and second derivatives:

$$f'(x) = \frac{x(x^2 - 3x - 10)}{(x-1)^3}, f''(x) = \frac{2(13x + 5)}{(x-1)^4}$$

It is further given that  $\frac{x^3 + 6x^2}{(x-1)^2} = x + 7 + \frac{13}{x-1} + \frac{6}{(x-1)^2}$ .

- Changing Grid Scales:**





## Section 2

### Amendments - MATH 1012

**Change piecewise function:**

$$f(x) = \begin{cases} 4e^x + mx - 4 & \text{if } -e < x \leq 0 \\ \ln(\ln(x + e)) & \text{if } 0 < x < e \end{cases}$$

## Change Choices:

- $1 + \frac{1}{3} \ln \left( \frac{1+e^3}{2} \right)$
- $1 + \frac{1}{3} \ln (1 + e^3)$
- $\frac{1}{3} \ln \left( \frac{1+e^3}{2} \right)$
- $1 + \frac{1}{3} \ln \left( \frac{2}{1+e^3} \right)$
- $1 + \ln(1 + e^3)$

## Section 3

### Amendments - MATH 1013

**Q7: Change Quantity Asked** Find  $\frac{d}{dx} (f \circ g^{-1}(x)) \Big|_{x=1}$ .

**Q14: Change Choices:**

- $1 + \frac{1}{3} \ln \left( \frac{1+e^3}{2} \right)$
- $1 + \frac{1}{3} \ln (1 + e^3)$
- $\frac{1}{3} \ln \left( \frac{1+e^3}{2} \right)$
- $1 + \frac{1}{3} \ln \left( \frac{2}{1+e^3} \right)$
- $1 + \ln(1 + e^3)$

**Q17: Change Quantities to Prove:**

$$(i) \quad V = \frac{25\pi}{432} [(96 + h)^3 - 96^3],$$

$$(ii) \quad A = \frac{65\pi}{144} [(96 + h)^2 - 96^2],$$

**Q20:**

Change  $k = -5$  to  $k = 5$