

PERSONAL CALENDAR & SELF ASSESSMENT – NOVEMBER

TIMETABLE

My timetable has remained largely the same as October. However, I've allowed myself more flexibility. I still allow myself the one-subject-per-day routine, but I don't limit as to what subject is designated to that day.

Furthermore, now that IPP is finished, I don't need to spend Saturday working on that module.

Student: MONTE, AARON AARON MONTE

Weeks: 6-17 (28 Sep 2020-20 Dec 2020)

	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00	16:30	17:00	17:30
Mon	///	///	///	///	///	///	///	///	///	4CCS1PPA PROGRAMMING PRA SY 000001/Online Small Group08 <9-10, 12-17> Mei Lan Poon 9-10, 12-17	///	///	///	///	CS1 self study	///	///	///	///	///
Tue	///	///	///	///	///	///	///	///	///	4CCS1PPA PROGRAMMING PRA SY 000001/Online Small Group08 <8>	///	///	///	///	///	///	///	///	///	///
Wed	///	///	///	///	///	///	///	///	///	4CCS1PPA PROGRAMMING PRA SY 000001/Online Small Group08 <8>	///	///	///	///	///	///	///	///	///	///
Thu	///	///	///	///	///	///	///	///	///	4CCS1PPA PROGRAMMING PRA SY 000001/Online Small Group08 <8>	///	///	///	///	///	///	///	///	///	///
Fri	///	///	///	///	///	///	///	///	///	4CCS1PPA PROGRAMMING PRA SY 000001/Online Small Group08 <8>	///	///	///	///	///	///	///	///	///	///

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SWSCUST Student Set Individual

<https://timetables.kcl.ac.uk/kclsws/SDB2021RDB/showtimetable.aspx>

Sat	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///
Sun	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///	///

Paul Muller
8, 10, 13, 15, 17

catch-up day

READING LIST

OBJECTS FIRST WITH JAVA

-DAVID J. BARNES & MICHAEL KOLLING

DISCRETE MATHEMATICS AND ITS APPLICATIONS

-KENNETH H. ROSEN

ESSENTIALS OF COMPUTER ORGANIZATION AND ARCHITECTURE

-LINDA NULL & JULIA LOBUR

COURSEWORK

As last month, each quiz has a weekly quiz that needs to be completed by the end of the month.

4CCS1PPA – CW2 WORLD OF ZUUL

This coursework is my first real test as a programmer. As a result, I've dedicated Mondays and Tuesdays to working on this coursework from when it was set. Unlike CW1, I've had no problems with regards to compatibility. I was able to work on everything through my iMac.

I've also given myself the deadline day as a "test day", as I received feedback on my first coursework where I've failed to catch errors regarding edge cases.

4CCS1RWS – TASK C

My job in Task C was to work on a particular section of the page. However, this was just a reference as we ended up helping each other out for each section of the page – in particular with handling images within margins.

1. Kieran

THEOREM 3—The Derivative Rule for Inverses If f has an interval I as domain and $f'(x)$ exists and is never zero on I , then f^{-1} is differentiable at every point in its domain (the range of f). The value of $(f^{-1})'$ at a point b in the domain of f^{-1} is the reciprocal of the value of f' at the point $a = f^{-1}(b)$:

$$(f^{-1})'(b) = \frac{1}{f'(f^{-1}(b))} \quad (1)$$

or

$$\frac{df^{-1}}{dx} \bigg|_{x=b} = \frac{1}{\frac{df}{dx} \bigg|_{x=f^{-1}(b)}}$$

2. Raphael

Theorem 3 makes two assertions. The first of these has to do with the conditions under which f^{-1} is differentiable; the second assertion is a formula for the derivative of f^{-1} when it exists. While we omit the proof of the first assertion, the second one is proved in the following way:

$f(f^{-1}(x)) = x$ Inverse function relationship

$\frac{d}{dx} f(f^{-1}(x)) = 1$ Differentiating both sides

$f'(f^{-1}(x)) \cdot \frac{d}{dx} f^{-1}(x) = 1$ Chain Rule

$\frac{d}{dx} f^{-1}(x) = \frac{1}{f'(f^{-1}(x))}$ Solving for the derivative

4. Nicole

EXAMPLE 1 The function $f(x) = x^3, x > 0$ and its inverse $f^{-1}(x) = \sqrt[3]{x}$ have derivatives $f'(x) = 3x^2$ and $(f^{-1})'(x) = \frac{1}{3\sqrt[3]{x^2}}$.

Let's verify that Theorem 3 gives the same formula for the derivative of $f^{-1}(x)$:

$$(f^{-1})'(x) = \frac{1}{f'(f^{-1}(x))} = \frac{1}{3(f^{-1}(x))^2} = \frac{1}{3(\sqrt[3]{x})^2} = \frac{1}{3\sqrt[3]{x^2}}$$

3. Aaron

Theorem 3 gives a derivative that agrees with the known derivative of the square root function.

Let's examine Theorem 3 at a specific point. We pick $x = 2$ (the number a) and $f(2) = 4$ (the value b). Theorem 3 says that the derivative of f at 2, which is $f'(2) = 4$, and the derivative of f^{-1} at $f(2)$, which is $(f^{-1})'(4)$, are reciprocals. It states that:

$$(f^{-1})'(4) = \frac{1}{f'(f^{-1}(4))} = \frac{1}{f'(2)} = \frac{1}{4}$$

See Figure 3.36.

We will use the procedure illustrated in Example 1 to calculate formulas for the derivatives of many inverse functions throughout this chapter. Equation (1) sometimes enables us to find specific values of df^{-1}/dx without knowing a formula for f^{-1} .

5. Dudu

4. Nicole

EXAMPLE 2 Let $f(x) = x^3 - 2, x > 0$. Find the value of df^{-1}/dx at $x = 6 = f(2)$ without finding a formula for $f^{-1}(x)$.

Solution We apply Theorem 3 to obtain the value of the derivative of f^{-1} at $x = 6$:

$$\frac{df^{-1}}{dx} \bigg|_{x=6} = \frac{1}{\frac{df}{dx} \bigg|_{x=f^{-1}(6)}} = \frac{1}{\frac{df}{dx} \bigg|_{x=2}} = \frac{1}{12} \quad \text{Eq. (1)}$$

6. Tihomir

Derivative of the Natural Logarithm Function

Since we know the inverse of the function $f(x) = e^x$ is differentiable everywhere, we can apply Theorem 3 to find the derivative of its inverse $f^{-1}(x) = \ln x$.

$$(f^{-1})'(x) = \frac{1}{f'(f^{-1}(x))} \quad \text{Theorem 3}$$

$$= \frac{1}{e^{f^{-1}(x)}} \quad f'(x) = e^x$$

$$= \frac{1}{e^{\ln x}} \quad x > 0$$

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

7. Siddarth

Alternate Derivation Instead of applying Theorem 3 directly, we can find the derivative of $y = \ln x$ using implicit differentiation, as follows:

$y = \ln x$ $x > 0$

$e^y = x$ Inverse function relationship

$\frac{d}{dx} (e^y) = \frac{d}{dx} x$ Differentiate implicitly

$e^y \frac{dy}{dx} = 1$ Chain Rule

$\frac{dy}{dx} = \frac{1}{e^y} = \frac{1}{x}, \quad e^y = x$

No matter which derivation we use, the derivative of $y = \ln x$ with respect to x is

$$\frac{d}{dx} (\ln x) = \frac{1}{x}, \quad x > 0.$$

The Chain Rule extends this formula to positive functions $u(x)$:

$$\frac{d}{dx} \ln u = \frac{1}{u} \frac{du}{dx}, \quad u > 0. \quad (2)$$

Other than that, we completed the coursework with two days to spare, and we managed to follow the timetable we set in the protocol well. (See next page).

TASK C – MEETING PROTOCOL

INTRODUCTION

Introduce ourselves, make sure everyone's mic is working

Team members:

- Raphael Dryer
- Kieran Woolley
- Siduduziwe Mswabuki
- Siddharth Thammineni
- Nicole Lehchevska
- Tihomir Stefanov
- Aaron Patrick Monte

SCHEDULING

In order to make sure we stick with deadlines, we are scheduling our tasks for when we have to do them by.

- **16th November (1100 GMT):** Finding the two pages we need to do, allocating which section is done by who.
- **23rd November (1100 GMT):** Sections are completed and we collate what we have done into one big file.

INDIVIDUAL TASKS

- Create a WhatsApp groupchat for more convenience (created by Nicole)
- Study how to do LaTeX and TeX