

# Technical Communication

## HW2

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### 1 WRITING MATHEMATICS

As a final example, consider the triple compositions

$$f(x) = \int_a^{\left(\int_a^{x^3} \frac{1}{1+\sin^2 t} dt\right)} \frac{1}{1+\sin^2 t} dt, \quad g(x) = \int_a^{\left[\int_a^x \frac{1}{1+\sin^2 t} dt\right]} \frac{1}{1+\sin^2 t} dt,$$

which can be written

$$f = F \circ F \circ C \quad \text{and} \quad g = F \circ F \circ F.$$

Suppose  $F(x) = \int_a^x \frac{1}{1+\sin^2 t} dt$  and  $C(x) = x^3$ , we have

$$\begin{aligned} f'(x) &= F'(F(C(x))) \cdot F'(C(x)) \cdot C'(x) \\ &= \frac{1}{1+\sin^2 \left(\int_a^{x^3} \frac{1}{1+\sin^2 t} dt\right)} \cdot \frac{1}{1+\sin^2 x^3} \cdot 3x^2. \end{aligned}$$

Likewise, we have

$$\begin{aligned} g'(x) &= F'(F(F(x))) \cdot F'(F(x)) \cdot F'(x) \\ &= \frac{1}{1+\sin^2 \left[\int_a^x \left(\int_a^x \frac{1}{1+\sin^2 t} dt\right) \frac{1}{1+\sin^2 t} dt\right]} \cdot \frac{1}{1+\sin^2 \left(\int_a^x \frac{1}{1+\sin^2 t} dt\right)} \cdot \frac{1}{1+\sin^2 x}. \end{aligned}$$

## 2 L<sup>A</sup>T<sub>E</sub>X

### 2.1 EXERCISE ON SLIDE 242

$$x_{4t}^{y+z}, \frac{y+\frac{3z}{2}}{b}, \sqrt[n]{\Omega}, \sum_{n=0}^{\infty} n, \int_0^1 \frac{1}{x} dx, \forall n \in \mathbb{N} \exists m \text{ such that } n-m=0$$

### 2.2 EXERCISE ON SLIDE 246

#### 1 Using package blindtext

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{i=n} x_i = \frac{x_1 + x_2 + \dots + x_n}{n}$$

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

$$\int_0^{\infty} e^{-\alpha x^2} dx = \frac{1}{2} \sqrt{\int_{-\infty}^{\infty} e^{-\alpha x^2} dx \int_{-\infty}^{\infty} e^{-\alpha y^2} dy} = \frac{1}{2} \sqrt{\frac{\pi}{\alpha}}$$

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

$$\sum_{k=0}^{\infty} a_0 q^k = \lim_{n \rightarrow \infty} \sum_{k=0}^n a_0 q^k = \lim_{n \rightarrow \infty} a_0 \frac{1 - q^{n+1}}{1 - q} = \frac{a_0}{1 - q}$$

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really?

Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-p \pm \sqrt{p^2 - 4q}}{2}$$

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$$\frac{\partial^2 \Phi}{\partial x^2} + \frac{\partial^2 \Phi}{\partial y^2} + \frac{\partial^2 \Phi}{\partial z^2} = \frac{1}{c^2} \frac{\partial^2 \Phi}{\partial t^2}$$

Hello, here is some text without a meaning. This text should show what a printed text will look like at this place. If you read this text, you will get no information. Really? Is there no information? Is there a difference between this text and some nonsense like “Huardest gefburn”? Kjift – not at all! A blind text like this gives you information about the selected font, how the letters are written and an impression of the look. This text should contain all letters of the alphabet and it should be written in of the original language. There is no need for special content, but the length of words should match the language.

## 2 Reproduce equations

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{i=n} x_i = \frac{x_1 + x_2 + \dots + x_n}{n}$$

$$\int_0^\infty e^{-\alpha x^2} dx = \frac{1}{2} \sqrt{\int_{-\infty}^\infty e^{-\alpha x^2} dx \int_{-\infty}^\infty e^{-\alpha y^2} dy} = \frac{1}{2} \sqrt{\frac{\pi}{\alpha}}$$

$$\sum_{k=0}^{\infty} a_0 q^k = \lim_{n \rightarrow \infty} \sum_{k=0}^n a_0 q^k = \lim_{n \rightarrow \infty} a_0 \frac{1 - q^{n+1}}{1 - q} = \frac{a_0}{1 - q}$$

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-p \pm \sqrt{p^2 - 4q}}{2}$$

$$\frac{\partial^2 \Phi}{\partial x^2} + \frac{\partial^2 \Phi}{\partial y^2} + \frac{\partial^2 \Phi}{\partial z^2} = \frac{1}{c^2} \frac{\partial^2 \Phi}{\partial t^2}$$

### 3 Vandermonde matrix

$$\begin{bmatrix} 1 & \alpha_1 & \alpha_1^2 & \dots & \alpha_1^{n-1} \\ 1 & \alpha_2 & \alpha_2^2 & \dots & \alpha_2^{n-1} \\ 1 & \alpha_3 & \alpha_3^2 & \dots & \alpha_3^{n-1} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & \alpha_m & \alpha_m^2 & \dots & \alpha_m^{n-1} \end{bmatrix}$$

#### 2.3 EXERCISE ON SLIDE 250

$$\tilde{E}(\omega) = \int_{-\infty}^{\infty} E_0 \sin(\omega_0 t) e^{-2i\pi\omega t} dt$$

$$\sin(x) = \frac{e^{ix} - e^{-ix}}{2i}$$

$$e^a e^b = e^{a+b}$$

$$\int_{-\infty}^{\infty} e^{it(x-x')} dt = 2\pi\delta(x-x')$$

$$\tilde{E}(\omega) = \frac{E_0}{2i} \int_{-\infty}^{\infty} e^{-2i\pi t(\omega - \frac{\omega_0}{2\pi})} - e^{-2i\pi t(\omega + \frac{\omega_0}{2\pi})} dt$$

$$\tilde{E}(\omega) = \frac{-2\pi^2}{i} E_0 [\delta(\omega - \frac{\omega_0}{2\pi}) - \delta(\omega + \frac{\omega_0}{2\pi})]$$

### 3 GROUP EXERCISE

I'm in Group 2, responsible for paragraph 4, 14 and 19.

#### 3.1 SUMMARY

In paragraph 4, the key idea author want to convey is, when writting something, we'd better have some target readers in mind. In this way, emphasis on will be paid at different levels and different aspects so that readers may have better understanding.

I paragraph 14, details about using correct words are explained. First of all, using words correctly does not mean to redundancy. Instead, it means to express both clearly and precisely so that ambiguity does not exist, and readers will not be confused or mislead. Also, instead of using symbolic notations, which is quite cumbersome, it's better to use sentences expressing arguments or theorems.

In paragraph 19, the author tells us not to be disturbed by editorial related issues. Some of editorial work like spelling check are helpful, but they may apply some editorial rules mechanically, which change the original meaning of contents. If some intrinsic words have been used, we should pay attention to keep them unchanged.

## 4 GRAMMAR

### 4.1 PLURALS OF GIVEN WORDS

- (a) means: means
- (b) paralysis: paralyses
- (c) curriculum: curricula/curriculum
- (d) oasis: oases
- (e) offspring: offspring/offsprings
- (f) criterion: criteria/criterions
- (g) Chinese: Chinese
- (h) antenna: antennae/antennas
- (i) stimulus: stimuluses/stimuli
- (j) fungus: fung/funguses
- (k) alumnus: alumni
- (l) series: series
- (m) diagnosis: diagnoses
- (n) vita: vitae
- (o) American: American
- (p) synopsis: synopses

### 4.2 FILLING THE BLANKS

- (a) The Decline and Fall of the Roman Empire
- (b) The complexity of the problem of the decline and fall of the Roman Empire is made evident by a wide variety of causes that are emphasized in varying degrees by \_\_\_\_\_ different authors.
- (c) Fortunately, a concise formulation of Edward Gibbon serves as a widely accepted basis for \_\_\_\_\_ modern discussion of the problem.
- (d) According to Gibbon, the empire reached its peak during the administration of \_\_\_\_\_ two Antonines.
- (e) After that, however, the extent of \_\_\_\_\_ Roman conquest became too great to be managed by \_\_\_\_\_ Roman government, the decline began.
- (f) The military government was weakened and finally dissolved as \_\_\_\_\_ barbarians were allowed to constitute an ever-growing percentage of the Roman legions.
- (g) The victorious legions began to dominate and corrupt the government, weakening it at the time when it most needed a strength to overcome \_\_\_\_\_ other problems.