

I 次の英文を読み、下の問いに答えなさい。（*を付した語句には、問題文の末尾に注がある。）

In the British education system in recent decades, students are often forced to choose between studying either math and science or studying the humanities*. I recall that at the end of my very last English class at high school, in 1991, the ⁽¹⁾teacher gave me a lovely handwritten note with a long list of books she thought I might like, saying, “Sorry to lose you to the lab*.” I was sorry that she considered me lost — because I wasn’t. I love language; I love the way words fit together; I love the way that fiction — like mathematics — can create, play with, and test the limits of imaginary worlds. I went off to Oxford University to study mathematics, very happy to be living one street away from the pub where my childhood literary heroes C. S. Lewis and J. R. R. Tolkien had met each week to discuss their work. The idea that one would have to choose between mathematics and literature is, I think, something of a tragedy — not only because the two fields are inseparably and fundamentally linked, but also because understanding these links can enhance your enjoyment of both.

We can find mathematics at the heart of literature. The universe is full of underlying structure, pattern, and regularity, and mathematics is the best tool we have for understanding it. That’s why mathematics is often called the language of the universe, and why it is so vital to science. Since we humans are part of the universe, it is only natural that our forms of creative expression, literature among them, will also manifest an inclination for pattern and structure. ⁽²⁾That feeling we get when we read a great novel or a perfect poem — that here is a beautiful thing, with all the parts fitting together perfectly in a harmonious whole — is the same feeling a mathematician experiences when reading a beautiful proof.

All writing has structure. Letters form words, words form sentences, sentences form paragraphs. Just like the point-line-plane hierarchy of geometry*,

rules can be imposed at any stage of writing. The question is not whether to have a structure, but what structure to choose. The French author Georges Perec once wrote a novel without once using the letter “e”. Eleanor Catton’s prize-winning novel, *The Luminaries*, imposes a precise numerical rule on its chapters, each of which is half the length of the last. In both cases, ⁽³⁾the structural restrictions echo and enforce the novels’ themes. The restrictions we choose inspire us to create, to see what is possible — and it’s just the same in math.

It’s worth pointing out as well that the links between mathematics and literature do not run in just one direction. Mathematics itself has a rich tradition of linguistic creativity. Going back to early India, Sanskrit* mathematics ⁽⁴⁾ followed an oral tradition*. Mathematical rules were converted to poetry so that they could be passed on by word of mouth. We think of mathematical concepts as relating to precise, fixed words: square, circle. But in the Sanskrit tradition, your words must fit into the meter* of your poem. Number words, for example, can be replaced with words for relevant objects. The number one can be represented by anything that is unique, like the Moon or the Earth, while “hand” can mean two, because we have two hands — but so can “black and white”, because that forms a pair. The expression “three voids* teeth” doesn’t mean a visit to the dentist, but that three zeros should follow the number of teeth we have: a poetic way to say 32,000. The huge variety of words and meanings lends a wonderful richness to the mathematics.

Just as mathematics makes use of literary metaphors, literature abounds with ideas that a mathematically trained eye can detect and explore. This adds an extra dimension to our appreciation of a work of fiction. As the pioneering Russian mathematician Sofia Kovalevskaya wrote, “It is impossible to be a mathematician without being a poet in soul . . . the poet must see what others do not see, must see more deeply . . . and the mathematician must do the same.” By seeing mathematics and literature as part of the same quest — to understand the

world and our place in it — we can add to our experience of both, and bring whole new kinds of enjoyment to our favorite writing.

注 humanities 人文学

lab (主に理数系の)実験室・研究所(laboratory の略)

geometry 幾何学

Sanskrit (古代インドの)サンスクリット語・文化の

oral tradition 口頭による伝承

meter 韻律

void 空白

- 1 下線部(1)について, ①高校の先生から受け取った手書きのメッセージの意味と, ②それについて筆者が思ったことを, それぞれ 50 字以内の日本語(句読点を含む)で説明しなさい。
- 2 下線部(2)を和訳しなさい。
- 3 下線部(3)が指している具体的な 2 つの事柄を, それぞれ 20 字以内の日本語(句読点を含む)で説明しなさい。ただし, 固有名詞は使用しないこと。
- 4 下線部(4)において, 数字「1」と「2」はどのようなもので表されるか, それぞれ 30 字以内の日本語(句読点を含む)で説明しなさい。
- 5 文学の中に数学を見いだすことができる理由について, 筆者の考えを 100 字以内の日本語(句読点を含む)で説明しなさい。

II 次の英文を読み、下の問いに答えなさい。（*を付した語句には、問題文の末尾に注がある。）

It's finally the weekend. This is your opportunity to rest and recharge your batteries from an exhausting work week. There is one problem, though. Relaxing is hard work in itself. You feel restless every time you sit down to take a break. But there's an irresistible urge to turn on the laptop and prepare for work on Monday.

What is going on? How can you look forward to the weekend (A) to struggle to detach from work? To (B) understand this paradox, we need to explore a fundamental concept in psychology: Unsatisfied needs influence your thoughts and actions.

This is apparent with physical needs. Imagine you are hungry, thirsty, or need to use the toilet but are stuck in traffic. Every second feels (イ) an eternity as you think about satisfying these needs. The same holds true for emotional needs. According to psychologist Abraham Maslow, needs are organized in a hierarchy with complex emotional needs emerging after basic physical needs have been satisfied. These include the need to feel safe, to belong, earn respect, and reach our fullest potential.

The psychologist David McClelland argued that additional needs are fundamental to human motivation including the need to achieve, which represents a drive to feel competent as you compete against a task, yourself, and others. Take a moment to consider how your need to achieve developed from a young age. When you were in school, you worked hard to earn good grades, make the soccer team, or perform at the school play. Parents and teachers praised you for performing well. Receiving approval and awards for a job well done only reinforced your need to achieve.

Your need to achieve is a chameleon that manifests differently based on your values. If you care about accumulating power, you will work tirelessly to

climb the corporate ladder. If you care about wealth, then your goal will be to make a huge amount of money and buy fancy stuff. If you are academically inclined, your focus is to boost your resume* with publications and presentations to stand (C) from peers. Sometimes the need to achieve is more subtle. If you prefer to stay at home, you may care most about having the best kept lawn in the neighborhood.

There is nothing wrong with setting and achieving goals as long as you are mindful of your motives and not completely consumed by your pursuits. The problem occurs when your need to achieve becomes excessive and overwhelms other parts of your life. Any time a need becomes excessive, you will develop a problem. This is apparent with physical needs. If you need to consume a hot fudge sundae* every night, it is only a matter of time before your health suffers. If you need 18 hours of sleep to have sufficient energy, then you are sleeping your life (D).

The same holds true for emotional needs. If you are desperate to be in a relationship and ignore warning signs, then you will settle for the wrong partner. If your need for safety is such that you are too afraid to leave your house, again you have a problem.

As society becomes increasingly more competitive and achievement-focused, it is easy to be swept by the chase to achieve more. Don't sacrifice your health and loved ones at the altar of achievement. Work (□) having a healthy relationship with achievement.

Here are four steps to master your need to achieve:

1. Redefine Success

Society defines success based on external standards that are easily viewed by many, such as fame and fortune. It idealizes those who excel (ハ) these areas. Resist such social expectations (ニ) focusing on internal, more intimate, standards, such as spending quality time with loved ones, being a good person, and doing a kind deed for the day. These standards may go unnoticed by

most but have a positive impact in your life and the lives of those who matter most to you.

2. Avoid Social Comparisons

Social comparisons make you feel the urge to do more. They are also a path to suffering. Comparing your real, messy life to someone's idealized image of their life does not serve you. Focus (E) on your personal journey. Concentrate on where you have been, where you are, and where you are heading. After all, we are pursuing different goals to fulfill different emotional needs.

3. Ask Yourself: Why

Before you start a journey towards a goal, press “pause” and reflect on your motives. (あ). Make sure you have realistic expectations of its potential impact on you. We often idealize success and overestimate its impact on happiness. The reality is that achievement comes with its fair share of challenges, such as increased responsibility, stress, and scrutiny. Having a complete picture will protect you from the trap of having unrealistic expectations.

4. Rest is Part of the Process

Taking a break can be hard when you have so many tasks to achieve but so little time. The natural reflex action is to push yourself beyond your limits by skipping exercise, having an extra cup of coffee to stay awake, and substituting nutritious meals (ホ) fast food. It is only a matter of time before such trade-offs come back to bite you. (い) in the long run. Set healthy boundaries with yourself. You are human and need to honor your limits.

注 resume 履歴書

hot fudge sundae シロップや果物のソースなどがかったアイスクリーム
の上に温かいチョコレートソースをかけたデザート

1 空欄(A)—(E)に入れるのに最も適した語を次の中から選び、それぞれ解答欄に書きなさい。ただし、各語は1回のみ使用できるものとする。

apart away better instead only

2 空欄(イ)—(ホ)に入れるのに最も適した語を次の中から選び、それぞれ解答欄に書きなさい。ただし、各語は1回のみ使用できるものとする。

by in like on with

3 空欄(あ)に入れるものとして、以下の語を最も適切な順に並べ替えたとき、5番目と9番目に来る語を解答欄に書きなさい(並べ替えたとき最初に来る語の最初の文字も小文字にしてある)。

a are ask considering goal
of particular pursuit the you
yourself why

4 空欄(い)に入れるものとして、以下の語を最も適切な順に並べ替えたとき、5番目と9番目に来る語を解答欄に書きなさい(並べ替えたとき最初に来る語の最初の文字も小文字にしてある)。

and care effective efficient less
make not of taking will
you yourself

III Choose one of the questions below and answer it in English. Your answer should be 100 to 140 words in length. Indicate the number of the question you have chosen. *Correctly* indicate the number of words you have written at the end of the composition.

1 When you read a book or watch a film, do you focus more on the story, the characters, or the atmosphere?

2 When speaking a foreign language, which aspect should people pay most attention to: correctness, creativity, or speed?

3 Which do you think is the most valuable quality for a leader: intelligence, ambition, or honesty?

IV 音声を聞き、その指示に従って、AおよびBの各問いに答えなさい。

A 下の1～6の空欄に入れるのに最も適切なものを選択肢イ～ニからそれぞれ一つ選び、その記号を解答用紙に書きなさい。

1 German small talk style is described as “coconutty” because _____.

- イ Germans prefer private conversations at work
- ロ Germans seem hard on the outside
- ハ it is similar to the American “peach” style
- ニ it mixes professional and personal topics

2 In “coconut” culture, _____.

- イ professionals take time for small talk
- ロ questions about private life are valued
- ハ small talk is not as important as work
- ニ work is not as serious as private matters

3 When meeting a “peach-like” American, _____.

- イ personal small talk indicates a close friendship
- ロ personal small talk shows interest and enthusiasm
- ハ you do not share personal information at first
- ニ you do not smile or ask many personal questions

4 The differences between “coconut” culture and “peach” culture are more likely to _____.

- イ create conflicts between people
- ロ encourage stereotypes
- ハ help people come closer
- ニ make people speak too much

5 In real life, “coconuts” and “peaches” _____.

- イ are fairly simple to understand
- ロ are not stereotypes of people
- ハ can be compared to a cultural bridge
- ニ include many different kinds of people

6 The speaker thinks the “coconut and peach” analogy _____.

- イ makes others adapt to our speech style
- ロ makes others decide which culture is better
- ハ will help us communicate with different people
- ニ will help us know in which business we belong

B 下の1～6の空欄に入れるのに最も適切なものを選択肢イ～ニからそれぞれ一つ選び、その記号を解答用紙に書きなさい。

- 1 Purple tomatoes are _____.
- イ commonly found on the shelves of supermarkets
 - ロ created by mixing dark-colored vegetables
 - ハ designed to not produce “anthocyanins”
 - ニ not found in nature
- 2 The substance that turns tomatoes purple might _____.
- イ add a berry-like flavor
 - ロ cause cancer in mice
 - ハ help humans live a longer life
 - ニ keep mice away from tomatoes
- 3 The fact that purple tomatoes have longer shelf life would _____.
- イ help consumers control the amount of food thrown away
 - ロ help our bodies stay young for longer
 - ハ make more people eat tomatoes cooked rather than fresh
 - ニ speed up the process of approval by the authorities
- 4 According to the speaker, one important difference between seedless fruits and purple tomatoes is _____.
- イ the speed and the accuracy of the process used to develop them
 - ロ where the products were first grown
 - ハ whether the technology made the product easier to eat
 - ニ whether their mass production happened naturally

5 Purple tomatoes will become available when _____.

- ㄱ technology becomes more advanced
- ㄴ the authorities decide they are safe
- ㄷ the developers apply for approval
- ㄹ the developers set new standards

6 The speaker's conclusion suggests that genetically engineered farm products _____.

- ㄱ should be approved by the authorities
- ㄴ should be taken into people's diet
- ㄷ will become common among consumers
- ㄹ will give suppliers more freedom

問題 A

When it comes to small talk at the office, are you a coconut or a peach? In other words, do you enjoy talking with people? Or, do you prefer just to work?

An expert in inter-cultural communication has made a very interesting comparison between German and American small talk styles using the metaphors of coconut and peach. She describes the German style as very coconutty and very business-oriented. You see, with Germans, only a very thin layer of private self is exposed at work. For them, work is work and personal is personal, and the two are rarely mixed. It's much more professional to remain reserved, focused, and serious, and not spend too much time inquiring into people's privacy with small talk. Of course, over time, you'll be able to crack through the hard coconut shell and enter the truly personal world, which is very nice and very milky, but not at first contact. It takes time. So, in coconut-culture, with these kinds of individuals, small talk is devalued in favor of work. In fact, if you spend too much time small talking, you'll be regarded as not professional.

Now, by contrast, you have the more peach-like American style. At first meetings, you dive straight into the soft personal area and ask lots of questions: "What do you do?", "Where are you from?", or "Do you have any children?" You're more likely to smile at strangers, chat, and share information with people you've just met to show lots of enthusiasm and explicit engagement with them. However, at the same time, it should be noted that this doesn't mean that you've become friends. You're just being friendly. This is the part of peach-culture which is often regarded as overly friendly by people from coconut cultures.

So, you see, coconut and peach, these two small talk styles are very, very different and they reveal important differences culturally and interpersonally. And, sometimes, these two styles don't go very well together. The coconut might feel that the peach is too friendly, over-optimistic and over-positive, and the peach might feel that the coconut is rather distant and cold, sometimes a little bit impolite and even arrogant.

Now, I understand that it sounds like I'm stereotyping, and I might seem to be oversimplifying things. Of course, in real life, you get different types of coconuts and

peaches. You have the most common type, and then you have the extreme types for any culture or any people. But, when I first learned about this coconut and peach analogy, it really helped me to put things into perspective because it gave me a moment to think: "Am I a coconut or peach?" and "What are my values?". It also made me think about what type of culture people belong to when I talk to them for the first time. There is no right or wrong. What's critical here is to think strategically... to know your own style and that of the others in order to create a strategy to bridge across the cultural gap.

So, the next time you go out and meet someone for the first time, go ahead... try it. If you keep this coconut and peach analogy in mind and communicate strategically, I'm sure you will have a great time talking with that person and be successful in whatever business you're engaged in.

問題 B

Would you believe me if I said there is such a thing as a purple tomato? Actually, tomatoes that are completely purple aren't available, just yet... but they do exist. Let me talk about this in a little more detail.

The purple tomatoes which I just mentioned have their purple color because they're genetically engineered. They're full of substances called "anthocyanins." Anthocyanins are found in foods like blueberries and blackberries, and they are the very reason those foods have their blackish purple color. They are good for the human body because they help human cells fight off stress; that helps human bodies stay healthy for a longer period of time. In 2008, in one study, a research team included purple tomatoes in the diet of mice who had cancer. They lived longer than those who also had cancer but were given red tomatoes. While some experts warn that the effects we see in lab animals don't always apply to humans, the results from other similar studies seem to follow this trend.

Another benefit of these purple tomatoes is that they can stay on the shelves of supermarkets or home kitchens longer than the red ones. They stay fresh twice as long... for about six weeks. This is good because being able to keep them in stores and kitchens longer would allow us to reduce food waste.

Meanwhile, there are two big questions around these genetically engineered farm products. Are they natural? And... are they safe?

At first glance, the question asking whether they are natural seems to have an obvious answer. It's "no," because, as I have already explained, they're genetically engineered and don't exist in nature. But, if we look at the history of our diet, the story is not that simple. Historically, from right after World War II, farmers have been making genetic changes to make their products better. For example, as you can well guess, the mass production of grapes and watermelons that don't have seeds didn't happen naturally. Those grapes and watermelons without seeds, to make them easier for humans to eat, are the product of years and years of research and development. Experts in this field say that what is done to products like purple tomatoes is not too different; it's just an

advanced, faster, and more precise version of what farmers have been doing to products like seedless grapes and watermelons.

That brings us to the question of safety. Could this higher-speed evolution actually make our foods unsafe? Well, that's where the government comes in. For these genetically engineered foods to make it to market, developers need to pass certain standards and get approval from authorities. The developers of purple tomatoes have already applied, and are waiting to get a green light from officials to sell their tomatoes in the US.

In conclusion, whether to take these genetically engineered farm products into one's diet really comes down to personal choice. However, I expect that in the future, we will be seeing more of these genetically engineered products. For now, my interest is... what a purple tomato sauce would taste like on my pasta and how purple ketchup would look on my fries.