

## 英語 I (選択)

次の文章に関して、空欄補充問題と読解問題の二つがあります。まず、[31]から[40]の空所を埋めるのに、文脈的に最も適切な語を 1 から 3 の中から選び、その番号を解答欄 (31) から (40) にマークしなさい。次に、内容に関する[41]から[45]の設問には、1 から 4 の選択肢が付されています。そのうち、文章の内容からみて最も適切なものを選び、その番号を解答欄 (41) から (45) にマークしなさい。

- 1 Last month, people in a small village in Kenya looked to the sky and saw a red glowing ring slowly descending. The half-tonne piece of metal [31](1. crashed 2. crushed 3. clashed) into a nearby thicket with a loud bang, leaving them shaken and perplexed. What was the mysterious object? Was it an alien spacecraft? Sadly, the truth of the matter was much more **prosaic**: it was a piece of space junk. This was not a one-off incident. Last year alone, we saw a large fragment from a Chinese space mission fall over southern California; a piece of space junk fell through a two-storey home in Florida, confirmed by Nasa to have originated from the International Space Station.
- 2 Even more concerning than large space detritus falling to Earth—if this is possible—is the [32](1. deprecation 2. accumulation 3. conception) of small debris in the lower orbit that could collide with larger objects such as satellites. The Kessler syndrome (named after former Nasa scientist Donald J Kessler) describes a scenario in which the volume of debris in Earth’s orbit reaches a critical [33](1. commonhold 2. manifold 3. threshold), triggering a cascade effect where collisions generate even more debris, which causes even more collisions. More than 560 in-orbit fragmentation events have been recorded since 1961, according to the European Space Agency, and the risks are intensifying. In June 2024, a defunct Russian satellite broke up into almost 200 pieces of debris, forcing astronauts on the International Space Station to take cover and prepare to evacuate in their spacecraft. Should the Earth’s orbit become unusable, this would [34](1. threaten 2. enhance 3. forecast) our ability to monitor weather, climate and other environmental changes, and to receive vital early disaster warnings on extreme weather events.
- 3 The Interconnected Disaster Risk report published in 2024 by the United Nations University identified space debris and collisions as at a [35](1. trying 2. tipping 3. tripping) point. Projections staggeringly estimate more than 100,000 new spacecraft will be launched by 2030, increasing the risk of collisions. The report also highlights that there currently are no binding international rules for managing space debris. The Outer Space Treaty (OST), established in 1967 and serving as the bedrock of space law since, is showing its limitations. As space activities have evolved from state-dominated explorations to include extensive commercial operations by non-state actors, such as the mega constellations deployed by companies like SpaceX and Blue Origin, the treaty falls [36](1. short 2. off 3. behind). It lacks, for example, specific guidelines for commercial activities, space mining, and crucially, mandates for debris mitigation and removal.

4 There are thankfully several solutions. Space-faring nations as well as regional organisations, such as the European Union, are funding specialised companies to remove active objects from orbit. Large debris requires effective management to minimise potential harm and the European Space Agency’s ClearSpace-1 mission showcases debris removal, [37](1. while 2. yet 3. unless) the Japanese company Astroscale is offering to remove operators’ redundant space hardware from orbit. These are all welcome approaches but may not be sustainable in the long term as space becomes more congested. [38](1. Otherwise 2. Moreover 3. Therefore), active debris removal solutions are an “end-of-pipe” approach, focused on managing the problem rather than solving it. Future solutions also need to address the core of the issue: how to design future space technology with zero-waste principles.

5 To [39](1. a degree 2. begin with 3. this end), the European Space Agency recently launched the idea of creating a “circular space economy” by 2050. Circular solutions include reuse, repair, recycling, eco-design, sustainable supply and responsible consumption. Many circular economy technologies are already being used in space programmes, including design for durability, closed-loop water and nutrient cycling in the International Space Station and 3D printing applications for repair and upgrades. New satellite innovations such as the world’s first wooden satellite, LignoSat, developed by Japanese researchers and launched into space in November 2024, show the way for the use of biomaterials in future lunar and Mars exploration. Biomaterials have lower density, so in case of collisions there is less kinetic impact and on re-entry, they would also more easily burn up. When it comes to the economic [40](1. fragility 2. viability 3. surplus) of a circular space economy, there is also a strong case. The reuse value of space debris has been estimated to be in the order of \$600 billion to \$1.2 trillion.

6 Legal measures that have proved effective in environmental governance and policy on Earth to control hazardous waste and pollution could also be applied. The “polluter pays” principle would place legal and financial responsibility on space operators and technology producers (this is particularly relevant to regulate the rapidly increasing number of private operators). A rare example of enforcement action was taken by the US Federal Communications Commission in October 2023, fining the operator Dish Network \$150,000 for failing to properly retire one of its satellites. Getting a UN-led agreement on space debris governance would require cooperation of all major stakeholders—but is vital to transcend geopolitical tensions, and protect space and those of us on Earth looking up at the sky.

—Based on Schröder, P. (2025). *The Guardian*.

[41] What does the author mean by the term “*prosaic*” in paragraph 1?

1. painful and catastrophic
2. ordinary and unimaginative
3. technical and complex
4. extraordinary and poetic

[42] What can we infer about the Outer Space Treaty from paragraph 3?

1. It has prevented the development of newer agreements by delaying international consensus.
2. It prohibits the deployment of satellites by private companies without prior approval from the UN.
3. It was originally designed to regulate small-scale commercial extraction of space minerals.
4. It was written for a technological and institutional context that no longer matches current practice.

[43] How does the author sequence the ideas in paragraph 4?

1. Status quo → Examples → Limitation → Critique → Proposal
2. Status quo → Limitation → Examples → Proposal → Critique
3. Examples → Limitation → Critique → Proposal → Status quo
4. Examples → Critique → Proposal → Status quo → Limitation

[44] Which of the following is *not* mentioned in paragraph 5?

1. A few circular economy technologies have already contributed to removing space debris.
2. LignoSat illustrates the potential of biomaterials for future space exploration.
3. One of the characteristics of natural materials is its inflammability on re-entry.
4. A circular space economy can be beneficial both environmentally and economically.

[45] Which of the following best summarises the main point in the passage?

1. While inactive satellites are cluttering space, stronger legal measures are important to protect active satellites and people on Earth.
2. If more funding is provided to companies specialised in removing space debris, designing future space technology will be economically sustainable.
3. Because closed-loop technologies are already in use, they can help reduce the risks of debris and collisions in space.
4. As commercial space activity ramps up, space debris poses a growing risk to active satellites and to people on Earth.

## 英語Ⅱ

次の文章に関して、空欄補充問題と読解問題の二つがあります。まず、[46]から[55]の空所を埋めるのに、文脈的に最も適切な語を1から3の中から選び、その番号を解答欄(46)から(55)にマークしなさい。次に、内容に関する[56]から[60]の設問には、1から4の選択肢が付されています。そのうち、文章の内容からみて最も適切なものを選び、その番号を解答欄(56)から(60)にマークしなさい。

- 1 Subcultures often emerge as byproducts of groups within society feeling disenfranchised with culture at large. Right now, young people around the world couldn't be more dissatisfied with the current state of affairs. They are voting less, rejecting party membership, and telling researchers that their country's leaders aren't working in their interests. [46](1. Regrettably 2. Blatantly 3. Arguably), subcultures have always existed throughout time, but the familiar concept of subculture officially entered the discipline of sociology (**albeit through a Western lens**) at the Chicago school in the 1920's, when it was applied to interpret "deviant" behaviour. They emerged more distinctly in the 20th century, with groups such as The Bloomsbury Group emerging in the 1910s, Teddy boys and girls in the post war 50s, punks in the 70s, goths in the 80s and skaters of the 90s, each responding to the cultural [47](1. policy 2. climate 3. heritage) of the time.
- 2 Then the internet changed everything. Some believe that social media killed subcultures, which are defined now by aesthetics and overnight trends rather than a movement with deeper or lasting cultural significance. However, as cultural curator Samutaro puts it: "Subcultures won't ever die, they just exist differently now. There are still a lot of interesting things happening."
- 3 Understanding the cultural and societal contexts of the times radically alters our interpretation of counterculture. We're holding subcultures today up against previous (and arguably more 'defined') ones of the past which had an extremely different contextual [48](1. backdrop 2. backfire 3. backchannel). One of the main differences between then and now is that today, we live in a consumerist society and an era of hyperindividualism. Audiences are addressed as 'consumers' and they themselves are brands. As Ari Versluis, photographer and co-founder of Exactitudes, the art collective says: "The way we organise cities has changed. There are cameras everywhere. There are hardly any spaces where you don't find places to consume." However, as academic Shane Blackman puts it, "subcultures may be consumerist, but that does not [49](1. eliminate 2. demonstrate 3. fulfill) their potential for resistance."
- 4 Beyond this, the internet has completely [50](1. nourished 2. restored 3. fragmented) the landscape in which subcultures exist, creating an immense number of disposable trends and an almost paralysing amount of information. In the era of the immersive internet, youth identities are now fluid

and dynamic. This has resulted in a more expanded definition of subcultures. “Is the internet a subculture?”, a young man in the US asked in our survey. “The boundaries of subcultures are so nebulous these days,” said another. Because of the internet, subcultures are more [51](1. fervent 2. fleeting 3. fruitful); Alexander Fury refers to them as being “like fruit flies.” They are often more aesthetically driven and with a lower level of personal commitment. On the contrary, the internet has allowed niche communities to connect and thrive through shared interests and beliefs. Now subcultures are, as Fury puts it, “a niche within a niche within a niche.” Examples from our survey include “weird neurodivergent queer Twitter subculture” and “climate change dystopian nihilist”. Are these multiplying niches reflective of a global youth desire to differentiate against a mass of homogeneity?

5 Subcultures are now niche and mass, community-driven and self-initiated, deep and surface level, past and present. You can now be part of multiple subcultures, you can [52](1. dip 2. lock 3. stream) in and out, and they’re more accessible. In the current ‘main character era,’ young people believe that it doesn’t even take a collective group to make a subculture. “I think people make subcultures by putting ‘core’ on the end of things. I think now one person is enough to be a subculture,” one person from our focus group told us. Subcultures now represent core elements of young people’s identity that provide meaning in a world where they feel disconnected from each other and from mainstream culture, incorporating everything from “Sikhism”, “arty lesbian”, “transgender”, “brainwashed Gen Z” and “queer femme.” Many responses in the survey reflected hyperindividual gender and ethnicity.

6 What’s clear is that the global [53](1. eruption 2. conservation 3. obligation) and mass adoption of subcultures and the niche reflects an increasing instability and lack of satisfaction with mainstream culture. As with the renaissance—a cultural movement characterised by an effort to revive and surpass the ideas of the past—we see this happening now through subcultures. Youth are [54](1. handing 2. taking 3. scaling) back control and using the internet as a space for connection, expression, remix and revival. The argument of whether they’re dead or alive is almost [55](1. irrelevant 2. morbid 3. fragrant) as subcultures resonate and reflect not only the mood of the time but the identities of youth now. Interrogating subcultures needs a new lens of analysis.

—Based on Farniloe, I. (2023). “Are we living through a great subcultural renaissance?” [www.dazeddigital.com](http://www.dazeddigital.com)

[56] Why does the author include the phrase “*albeit through a Western lens*” in paragraph 1?

1. To acknowledge that early theories were developed within a limited cultural framework
2. To emphasize the global relevance and lasting influence of early studies on subcultures
3. To suggest that Western societies produced the most influential subcultures at the time
4. To caution that cultural practice may be viewed as transitional work in Western contexts

[57] What role does Samutaro’s quote play in paragraph 2?

1. It reinforces the view that subcultures have lost their deeper cultural meaning.
2. It frames social media as a possible force for cultural revival.
3. It challenges the idea that subcultures have been erased by digital trends.
4. It emphasizes the influence of curators in shaping cultural identity.

[58] What does the author suggest about identity today in paragraph 3?

1. People curate how they appear to others in ways shaped by cultural trends and commercial logic.
2. People are starting to embrace freer forms of expression as a way to escape social expectations.
3. People tend to define who they are through inherited traditions, shared values, and group identity.
4. People believe personal identity is stable over time and largely untouched by external influences.

[59] Which summary best reflects the author’s view of contemporary subcultures in paragraph 5?

1. They bring like-minded people together through common beliefs and communities.
2. They act as personal brands used to stand out and gain attention.
3. They are mostly surface-level trends with little impact on self-cultivation.
4. They help shape identity by mixing style, taste, uniqueness and chosen communities.

[60] Which of the following best matches the author’s main point in this passage?

1. Young people today follow fast-changing trends that are divorced from society.
2. A focus on self-image has weakened youth connection and communication.
3. Youth express themselves in new ways but still find meaning and connection.
4. Traditional communities are no longer sufficient, and online culture is too fractured.

数学の解答は解答用紙の解答欄 (61)~(126) にマークしてください。

## 数学Ⅲ

関数

$$f(x) = \log_2(x+3) - \log_4 x$$

は、 $x = \boxed{\text{(61)}} \boxed{\text{(62)}}$  のとき、最小値  $\log_4 \boxed{\text{(63)}} \boxed{\text{(64)}}$  をとる。また、方程式  $f(x) = 3$  の2つの解を  $\alpha, \beta$  とするとき

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\boxed{\text{(65)}} \boxed{\text{(66)}}}{\boxed{\text{(67)}} \boxed{\text{(68)}}$$

$$(\alpha^2 - 59\alpha + 9)(\beta^2 + 32\beta + 9) = \boxed{\text{(69)}} \boxed{\text{(70)}} \boxed{\text{(71)}} \boxed{\text{(72)}}$$

である。

数学IV

AB = 3, AC = 7,  $\angle ABC = 120^\circ$  である  $\triangle ABC$  について考える.

(1)  $\triangle ABC$  の面積は  $\frac{\boxed{73}\ \boxed{74}}{\boxed{75}\ \boxed{76}} \sqrt{\boxed{77}\ \boxed{78}}$  である.

(2)  $\triangle ABC$  の内接円の半径は  $\frac{\boxed{79}\ \boxed{80}}{\boxed{81}\ \boxed{82}} \sqrt{\boxed{83}\ \boxed{84}}$  である.

(3)  $\triangle ABC$  の内接円の中心を I とするとき, IC の長さは  $\boxed{85}\ \boxed{86} \sqrt{\boxed{87}\ \boxed{88}}$  である.

(4)  $\triangle ABC$  の内接円と外接し, 辺 BC および辺 AC と接する円の半径は  $\frac{\boxed{89}\ \boxed{90} \sqrt{\boxed{91}\ \boxed{92}} + \boxed{93}\ \boxed{94} \sqrt{\boxed{95}\ \boxed{96}}}{\boxed{97}\ \boxed{98}}$  である (ただし  $\boxed{91}\ \boxed{92} < \boxed{95}\ \boxed{96}$  とする).

次に,  $\triangle ABC$  と合同な三角形 2 個と, 3 辺の長さが 3, 7, 9 である三角形 2 個を面とする四面体  $T$  について考える.

(5) 四面体  $T$  において, 長さが BC と等しい辺と長さが 9 である辺のなす角を  $\theta$  ( $0^\circ \leq \theta \leq 90^\circ$ ) とするとき,  $\cos \theta = \frac{\boxed{99}\ \boxed{100}}{\boxed{101}\ \boxed{102}}$  である.

数学V

$a_1 = 1, a_2 = 2, a_{n+2} = 2a_{n+1} + a_n$  で定まる数列  $\{a_n\}$  を考える.

(1)  $a_5 a_7 - (a_6)^2 = \boxed{(103)(104)}$  である.

(2) 方程式  $169x + 70y = 1$  は整数解を無数にもつ. これらの解のうち,  $x > 200$  と  $y > -600$  を同時に満たすものは  $x = \boxed{(105)(106)(107)(108)}$ ,  $y = \boxed{(109)(110)(111)(112)}$  である.

(3)  $\sum_{k=1}^8 a_k a_{k+2} - \sum_{k=1}^8 (a_{k+1})^2 = \boxed{(113)(114)}$  である.

(4)  $a_{11} = 5741$  と  $a_{12} = 13860$  の最大公約数  $d$  は  $\boxed{(115)(116)}$  であり, 方程式  $a_{12}x + a_{11}y = d$  は整数解を無数にもつ. これらの解のうち,  $x$  が正の整数で最小となるものは  $x = \boxed{(117)(118)(119)(120)(121)}$ ,  $y = \boxed{(122)(123)(124)(125)(126)}$  である.