令　和　3　年　度

（ページ数）
7ページ

試験問題（記述式）—英　　語

（注意） 解答はすべて別紙解答用紙の定められた欄に書くこと。

1 次の文を読んで、設問に答えよ。

The great Greek scientist, engineer and mathematician Archimedes left us two quotes that ring through the centuries. His study of levers is said to have led him to remark, "Give me a place to stand, and I will move the world." And the famous *Eureka!* ("I have found it!") came from his discovery, allegedly while taking a bath, that the volume of an irregularly shaped object could be determined by (　A　) it (　B　) (　C　) (　D　) (　E　) (　F　) it (　G　). Sadly, there's no evidence that he ever uttered the mash-up "Give me a place to stand, and I will take a shower." Which seems like an Archimedes screwup.

The history includes the fact that the word "calculus" comes from the Latin root *calx*, meaning a "small stone." "A reminder of a time long ago," Strogatz writes, "when people used pebbles for counting and thus for calculations ... . Doctors use the same word for gallstones, kidney stones, and bladder stones[(1)]." In my younger days, I studied derivatives and integrals, but I don't recall learning until I read *Infinite Powers* that both of the two 17th-century geniuses usually credited with the invention of calculus, Isaac Newton and Gottfried Wilhelm Leibniz, "in a cruel irony[(2)] ... died in excruciating pain while suffering from calculi—a bladder stone for Newton, a kidney stone for Leibniz." At least it was just hyperbole if you ever complained in school that calculus was killing you.

1-1　(　A　) ~ (　G　) に(1) ~ (7)より選んで入れよ。

(1) much　(2) and　(3) measuring　(4) submerging　(5) how
(6) water　(7) displaced

1-2　下線部(1)を訳せ。

1-3　下線部(2)を日本語40字以内で説明せよ。

2 (1)から(4)を正しい順に並べ替えよ。

A woman in Rhode Island went to the emergency room when her skin and blood took on an odd hue: She was turning blue, according to a new report of the case.

(1) The condition, called methemoglobinemia, essentially suffocates the body's tissues and can cause serious damage if blood oxygen levels drop below 70%, according to Medscape.

(2) The medication can have an unusual and potentially dangerous side effect: Benzocaine can cause iron in the blood to give up electrons, change form and no longer bind properly to oxygen, according to NBC. The body relies on sturdy bonds between iron and oxygen to move the life-sustaining element through the body. Without adequate oxygen, normally red blood can turn blue, and the skin and nails soon follow.

(3) In this case, blood drawn from the patient's arteries appeared deep navy blue, when it should have been bright red, according to the case report. What's more, her blood oxygen level had dipped to 67%, when it should have been hovering near 100%, NBC reported. The doctors quickly administered a medication called methylene blue, which restores iron to its proper form within the blood.

(4) "I'm weak and I'm blue," the 25-year-old told her doctors, according to Otis Warren, a physician at Miriam Hospital who treated the woman and spoke to NBC News. The patient reported applying "large amounts" of topical benzocaine, a numbing medication, on an aching tooth the night before, Warren and colleagues wrote in the report about the woman's case, published Sept. 19 in *The New England Journal of Medicine*.

After two doses of the drug and a night in the hospital, the patient's normal coloring returned, her blood oxygen levels rose and she went home having fully recovered.

3 次の文を読んで、設問に答えよ。

The real reason for ravens at the Tower* is probably to impress tourists, most of whom see the birds only once. But the ravens continue to impress Skaife, who sees them daily. "Experts in avian cognition have designed all sorts of tests and experiments to measure birds' cognitive abilities and behavior," Skaife writes, "and I'm proud to say that our ravens at the Tower have assisted in many a scientific study. The consensus among the experts seems to be that ravens can carry out all sorts of tasks that it (　a　) (　b　) (　c　) (　d　) (　e　) (　f　) (　g　)." Like mess with tourists.

"I've seen Merlina lying on her back, playing (　ア　)," Skaife told me, "much to the (　イ　) and horror of the visitors who come to the Tower of London." We had two ... ladies the other week, actually, who were in tears watching Merlina lying there. She puts her wings out, legs in the (　ウ　). Honestly, she stays as still as she possibly can. For up to 10 minutes ... . And everybody walks past and says, 'A raven's dead! Raven's dead!' and I say, "No. Watch her. She's just doing it either because she's (　エ　) or she's getting a bit of a (　オ　)... . It's something that they do, and <u>they do it in the wild as well.</u>"

＊　ロンドン塔

3-1　(　a　) ~ (　g　) に(1)~(7)より選んで入れよ。ただし、(1)は (　e　) には入らず、(3)は (　b　) には入らない。

(1) only　(2) handle　(3) thought　(4) primates　(5) was
(6) previously　(7) could

3-2　(　ア　) ~ (　オ　) に(a)~(e)より選んで入れよ。

(a) bored　(b) dead　(c) air　(d) dismay　(e) suntan

3-3　下線部を和訳せよ。

4 次の文を読んで、設問に答えよ。

The randomized controlled trial (RCT) is often called the "gold standard of evidence" in medical research involving humans. In such an experiment, a random sorting leads to only some subjects getting the real intervention being tested.

The first known RCT took place in 1747, when Dr. James Lind, surgeon on the HMS *Salisbury*, staked out his place in history by giving some scurvy patients citrus fruits. At first, anyway. Then all the sailors got citrus, as it became obvious that scurvy was preventable through the inclusion in the diet of vitamin C via consumption of oranges, lemons and—of key importance to etymologists—limes, which led to all British sailors, and then all Brits in general, to become known as Limeys.

The write-up was a response to a long-held criticism of RCTs, namely, that you don't need them to make reasonable conclusions about certain effects of certain actions—such as jumping out of a plane without a parachute. Indeed, the 2003 *BMJ* paper's objective, "To determine whether parachutes are effective in preventing major trauma related to gravitational challenge," met with a hard landing. "We were unable to identify any randomised controlled trials of parachute intervention," the authors admitted.

They explained further: "As with many interventions intended to prevent ill health, the effectiveness of parachutes has not been subjected to rigorous evaluation by using randomised controlled trials. Advocates of evidence based medicine have criticised the adoption of interventions evaluated by using only observational data. We think that everyone might benefit if the most radical protagonists of evidence based medicine organised and participated in a double blind, randomised, placebo controlled, crossover trial of the parachute."

Which brings us to the Christmas issue of the *BMJ*, always stocked with unconventional scholarship. The 2018 edition took up the gauntlet thrown back in 2003—researchers from Harvard University, the University of Michigan and U.C.L.A. joined with skydivers to publish "Parachute Use to Prevent Death and Major Trauma When Jumping from Aircraft: Randomized Controlled Trial."

The team enlisted and randomized 23 volunteers. Twelve participants wore parachutes while the other 11 donned backpacks that contained no parachutes. All 23 leapt from either a plane or a helicopter. The jumpers were assessed shortly after hitting the ground for death or major trauma, and most were reevaluated 30 days later.

The authors wrote, "We have performed the first randomized clinical trial evaluating the efficacy of parachutes for preventing death or major traumatic injury among individuals jumping from aircraft. Our groundbreaking study found no statistically significant difference in the primary outcome between the treatment and control arms." Indeed, all members of both cohorts were fine.

The researchers further note, "A minor caveat to our findings is that the rate of the primary outcome was substantially lower in this study than was anticipated ... [subjects] could have been at lower risk of death or major trauma because they jumped from an average altitude of 0.6 m [just under 2 feet] on aircraft moving at an average of 0 km/h." As the reader suspected, the (1) (2) (3) (4) (5) ground.

The researchers also said, "Opponents of evidence-based medicine have frequently argued that no one would perform a randomized trial of parachute use. We have shown this argument to be (a), having conclusively shown that it is possible to randomize participants to jumping from an aircraft with versus without parachutes (albeit under limited and specific scenarios)."

By the way,（ ア ）（ イ ）（ ウ ）（ エ ）（ オ ）parachutes—if you throw around square yards of fabric and feet of strings, somebody could get hurt.

4-1　次の文は第何段落目の後に来るか。

Skip ahead a quarter of a millennium to 2003, when the *BMJ*, formerly known by its spelled-out name of the *British Medical Journal* (and informally to some as the Limey Medical Journal), published an article entitled, "Parachute Use to Prevent Death and Major Trauma Related to Gravitational Challenge: Systematic Review of Randomised Controlled Trials."

4-2 （ 1 ）~（ 5 ）に英語1ワードずつを入れて、文を完成させよ。

4-3 （ a ）に英語1ワードを入れよ。

4-4 （ ア ）~（ オ ）に次より入れると（ エ ）に来るのはどれか。ただし、(1)は（ ア ）には入らない。

(1) actually　(2) their　(3) deployed　(4) no　(5) participants

5 次の英文を読んで、設問に答えよ。

Perhaps the only funny item in Jared Diamond's new book *Upheaval: Turning Points for Nations in Crisis* is an anecdote about what was known as the Winter War. When the Soviet Union invaded Finland in late 1939, the Finns resisted against the much larger Soviet forces until the two countries compromised on an（ 1 ）peace.

Various countries sent equipment to help Finland defend（ 2 ）. One such gift was World War I artillery from Italy. "Each artillery piece requires not only a gunner ... but also someone called a spotter stationed some distance in front of the gun, in order to spot where the shell lands and（ 3 ）to correct the（ 4 ）setting for the next shot," Diamond explains. Of course, these large guns have（ 5 ）recoils—and they were not designed well for absorbing that jolt. So the Finns（ 6 ）up using two spotters: the usual one in front to see where the（ 7 ）landed, "plus another spotter behind the gun to（ 8 ）（ 9 ）the（ 10 ）landed!"

5-1 （ 1 ）~（ 5 ）に(A)~(E)より選んで入れよ。

(A) range　(B) uneasy　(C) hefty　(D) thereby　(E) itself

5-2 （ 6 ）~（ 10 ）に(F)~(J)より選んで入れよ。

(F) gun　(G) see　(H) wound　(I) where　(J) shell

6 次の文を読んで、設問に答えよ。

In this space back in February 2012, I addressed the issue of hunters being shot by their dogs. These rare cases of canine culpability inevitably result from a stray paw, or a stray's paw, happening onto the trigger of an unsecured firearm. The dogs may be wearing one, but the police don't get a collar, because the incidents are accidents. Well, they're probably accidents—some dogs can be cagey. (Okay, I admit that writing those shameless sentences really hit the Spot.)

Anyway, recent events inspired me to (あ) this dog-shoots-man topic, which of course is a fascinating variation on the man-bites-dog story.

In February the online British newspaper the *Independent* (い) a story with a headline that started out goofy— "Man Shot by His Pet Dog ..." —but then turned sensibly serious— "... Is Ruled Unfit to Own Guns." The tale begins in 2016, when a German man got a shot in the arm—and not in a good way—when his supposed best friend, according to the article, "managed to release the trigger on a loaded rifle left in his car." Oddly enough, dogs and firearms both have (う), which in this case, was at least one too many.

The victim, described as a "passionate hunter," then had his rifle license and hunting permit revoked. He appealed that decision, which a court has just recently decided not to (え) over. The news article quotes the ruling's reasoning, which is as follows: "it must be assumed that he will handle firearms and ammunition carelessly in the future as well." Bull's-eye.

By the way, in a subversive act of dogmatic commentary, the *New York Daily News* illustrated its coverage of this story with a photograph of a happy, healthy deer: buck unshot. Which, after posing for the camera, presumably wandered away into the woods, stag.

(The *Daily News* also reported that the initial revocation of the man's credentials was made by the municipality of Pfaffenhofen. Which is a fun word to say but is also intriguing because, according to Google Translate, *Affen Hof* means "(お) court" in English. And depending on the firearm's visual-aid accoutrement, we could have had a Scopes trial.)

Back in the U.S.A., in November 2018 a man in New Mexico joined his brother from another fatherland. Again, the *Independent* was on the case. "Man Shot by Pet Dog ... ," the headline began before turning even more surreal, "... Insists 'He [the dog] Didn't Mean to Do It.' " And I believe that. Because the dog was a 120-pound Rottweiler mix and therefore didn't need any help to inflict damage. Although a gun still makes it easier.

I'm sincerely happy to say that the man, who reportedly suffered "three broken ribs, a punctured lung and a broken scapula," survived. And I'm sincerely sad to say that as this piece went to the printer, the Associated Press reported that the dog had died—shot by a rancher after it escaped from its owner's property. As has been said many times, we don't (A) dogs.

The actual good news on shooting accidents, whatever species pulls the trigger, is that deaths caused by them in the U.S. are down. The *Los Angeles Times* reports that in 2015, the most recent year with available data, "there were 489 people killed in (か) shootings ... , down from 824 deaths in 1999," according to the Centers for Disease Control and Prevention. "Experts attribute the decline to a (き) of gun safety education programs, state laws regulating gun storage in homes and a (く) in the number of households that have guns," the article says.

So to anyone who thinks such measures won't make us all safer: that dog won't hunt.

6-1　次の文を入れると第何段落目の次に入るか。

The seriously injured man was in his pickup truck with the shooter and the gun that he left "positioned in the truck with the barrel facing up, towards [the man]," according to a sheriff's spokesperson quoted in the piece.

6-2　（　あ　）~（　く　）に(1)~(8)より選んで入れよ。

(1) muzzles　(2) unintentional　(3) drop　(4) monkey　(5) ran

(6) mix　(7) roll　(8) revisit

6-3　（　A　）に英語1ワードを入れよ。