英　　語

問題冊子 2

~~~~~~~~~~~~~~ 注　　　意 ~~~~~~~~~~~~~~

「**問題冊子 2**」に印刷されている問題は，2 から 3 までで，2 ページから
14 ページまであります。

2 次の対話の文章を読んで，あとの各問に答えなさい。
（＊印の付いている単語・語句には，本文のあとに〔注〕がある。）

Mari and Ken are high school students, and Jan is a student from Germany who is studying at their school. One day after school, they are talking in their homeroom.

Mari:	Did you enjoy watching your favorite TV program last night?
Ken:	No, I didn't.
Jan:	☐ 1-a
Ken:	Actually, the program was not shown. Instead, a program about an *election was shown.
Mari:	That's right. An election is coming up soon.
Ken:	Yes. So I couldn't watch my program.
Mari:	I'm sorry to hear that, Ken, but I hear it's going to be an important election.
Ken:	Really? I'm too young to understand elections.
Mari:	Do you think so? The *law was changed a few years ago, and now you can *vote at eighteen. Some of us will have a chance to vote while we are still in high school. Don't you want to vote?
Ken:	No, not really. I don't think we should be able to vote so young.
Jan:	You don't? In my country we can also vote after we turn eighteen. I don't understand why you aren't interested in voting.

Just then, Mr. Oka, their homeroom teacher, comes into the classroom.

Mr. Oka:	Oh, so you are still here. What are you doing?
Mari:	We are talking about voting, Mr. Oka. Ken thinks we are still too young to vote when we are eighteen.
Mr. Oka:	☐ 1-b
Ken:	We are still in high school and don't know much about the real world around us.
Mari:	Do you have to know a lot about the world before you should be able to vote?
Ken:	Of course. Don't you think so?
Mr. Oka:	Wait a minute. In Japan the lowest age for voting was twenty until a few years ago. Why don't we think about why the law was changed?
Mari:	Yes. *According to the newspaper I read, the change *had to do with our *aging *society.
Ken:	What do you mean?
Mari:	If many old people vote and young people don't, the voices of young people will not be heard. ₍₂₎Then I'm afraid 【① make ② to ③ done ④ be ⑤ nothing ⑥ the situation ⑦ will 】 better for young people.

— 2 —

Jan:　　You are right. As I said, we can vote when we turn eighteen in Germany. In many other *developed countries, such as Australia, the U.K., and France, the age is also eighteen.

Mari:　　Looks like we've just *caught up.

Jan:　　In Germany, you can also *run for an election when you are eighteen. I think that is also true in the U.K. and France.

Ken:　　Really?　[　1-c　]　But as I said before, I still think we are too young. Without experience in the real world, our thinking may be wrong.

Mr. Oka:　　I understand what you mean, but is it a bad thing for young people to be interested in *politics?

Ken:　　I think we should become interested in politics only when we have enough knowledge and experience. Though my parents are interested in politics themselves, they say that studying should be at the center of my school life.

Jan:　　I don't think you or your parents are wrong. But I think it is important even for young people like us to be interested in politics and other *social issues to try to make our society better.

Mari:　　My parents are not like yours, Ken. They say it's important to be interested in politics, even though I'm still a high school student. We talk about politics at dinner, and I like reading news about elections and politics.

Jan:　　The other day I was reading a newspaper and learned how much young people were interested in politics in different countries of the world.

Mr. Oka:　　[　1-d　]

Jan:　　Well, the *percentage of young people who were very interested in politics was about 23% for Germany and 22% for the U.S. I'm sad the numbers were not high, but it was even lower for Japan, about 10%.

Mari:　　Really?

Jan:　　Yes, and while more than 50% of young Germans believed they could change their society, only a little over 30% of young Japanese thought so.

Ken:　　I think I know why. We don't know the real world, so we think adults should take part in politics and try to make a better society.

Jan:　　[　1-e　]　We do not have as much experience as adults, and our thinking may be wrong. But even as young people, we know about some of the problems in our society, and we need to tell people about them and try to improve the situation. And I think voting is very important for that purpose.

Mari:　　(3)I feel the same way. If there is a problem, we should do something about it.

Jan:　　Very true. If you are not interested at all and do nothing, you cannot improve anything. You will lose a chance to make a better society.

Ken:　　I think I'm beginning to understand your point.

Mari: Good! Actually, there are a lot of things we should think about.

Ken: | 4-a |

Mari: | 4-b |

Ken: | 4-c |

Jan: | 4-d |

Ken: | 4-e |

Mari: But there are still some things we can improve. You know we have a baseball stadium and a rugby field near our school, as well as the National Stadium. Now the streets around our school are not *wide enough, and on weekends, they are very crowded with people going to baseball and rugby games. We can make the situation better by making the streets wider or by making *sidewalks.

Ken: When you think about more and more people from abroad coming here, we should also do something to give them more information. We can *put up more signs in different languages, for example.

Jan: I think the Tokyo *Metropolitan Government will take care of these things. Right?

Mari: Right. But they may not know about the problems if we don't tell them. We should *express our opinions to the Metropolitan Government. And I believe one of the ways to do that is to vote in an election for a person who supports such opinions.

Ken: Now, can you think of anything you want the Japanese government to do?

Jan: You use too many of the free plastic bags that stores give you. That's surprising to me.

Ken: You're right, Jan, but plastic bags are really convenient.

Jan: Ken, | 5 |. You should use your own bag and reduce plastic waste. You need to know that plastic waste is creating serious problems in the environment all over the world. For example, a study has shown that between 5 million and 13 million tons of plastic waste goes into the ocean every year.

Mari: Yes, I've heard about that. The ocean is *polluted by plastic waste, and some kinds of sea animals become sick or die because they eat it *by mistake.

Ken: Well, something has to be done to reduce this plastic waste. Maybe there should be a new law that stops stores from giving people free plastic bags.

Mari: Very important point. Again, you can and should express your opinions to the government.

Ken: I think I'm beginning to become interested in voting and taking part in politics.

Jan: That's good!

〔注〕 election　選挙　　　　　　law　法律　　　　　　　　vote　投票する
　　　according to ～　～によると　have to do with ～　～と関係がある
　　　aging　高齢化する　　　　　society　社会　　　　　　developed country　先進国
　　　catch up　追いつく　　　　 run for ～　～に立候補する
　　　politics　政治　　　　　　　social issue　社会問題　　percentage　パーセント
　　　wide　広い　　　　　　　　 sidewalk　歩道　　　　　　put up　掲げる
　　　metropolitan　首都の　　　　express　表現する　　　　 pollute　汚染する
　　　by mistake　間違って

〔問1〕 ［　1-a　］ ～ ［　1-e　］ の中に，それぞれ次のア～キのどれを入れるのが
　　　よいか。ただし，それぞれの選択肢は一度しか使えないものとする。

　　　ア　I don't agree.　　　イ　What makes you think so?　　ウ　What did you learn?
　　　エ　Why should we?　　オ　Why not?　　　　　　　　　　カ　I'm surprised.
　　　キ　You were right.

〔問2〕 (2)Then I'm afraid【① make　② to　③ done　④ be　⑤ nothing　⑥ the situation
　　　⑦ will】better for young people. とあるが，本文の流れに合うように【　】内の
　　　単語・語句を正しく並べかえたとき，1番目と3番目と5番目に来るものの組み合わ
　　　せとして最も適切なものは，次のア～カの中ではどれか。

	1番目	3番目	5番目
ア	⑤	①	⑦
イ	⑤	③	②
ウ	⑤	④	②
エ	⑥	①	②
オ	⑥	③	④
カ	⑥	⑦	①

〔問３〕 (3)I feel the same way. とあるが，その内容を次のように書き表すとすれば，
3-a ～ 3-c にどのような1語を入れるのがよいか。**本文中に使われている語**をそのまま用いて書け。

I think it is important to 3-a . People should know what is 3-b with our society. We need to tell them about it and try to make the situation 3-c than it is.

〔問４〕 本文の流れに合うように， 4-a ～ 4-e の中にそれぞれ英文を入れるとき，その組み合わせとして最も適切なものは，下の**ア～カ**の中ではどれか。

① That's right. We shouldn't miss it.
② I agree.
③ For example?
④ Actually, much has already been done, and the area around the stadium has become a very beautiful place.
⑤ Well, our school is near the National Stadium, and as the Tokyo Olympics and Paralympics are coming so soon, it's a good chance to make this area nicer.

ア	② → ④ → ① → ③ → ⑤
イ	② → ④ → ⑤ → ③ → ①
ウ	② → ⑤ → ① → ④ → ③
エ	③ → ④ → ⑤ → ② → ①
オ	③ → ⑤ → ① → ④ → ②
カ	③ → ⑤ → ④ → ② → ①

〔問５〕 本文の流れに合うように， 5 に英文を入れるとき，**適切でないもの**は，次の中ではどれか。

ア the situation is very serious
イ they are creating a big problem
ウ they have put the environment in a dangerous situation
エ I also think convenience is most important
オ you should think more about that

〔問6〕 本文の内容に合う英文の組み合わせとして最も適切なものは，下の**ア〜シ**の中ではどれか。

① Ken was waiting in the evening for a TV program about an election to begin.

② At first, Ken thought that he should not be able to vote at eighteen because he did not know what the real world was like and did not have enough experience.

③ Mari says that the age for voting was changed because the government wanted young people to become interested in politics.

④ Ken's parents and Mari's think in different ways about politics for high school students.

⑤ According to the newspaper Jan read, almost one out of four young people in Germany was strongly interested in politics and about one out of five young people was so in Japan.

⑥ According to the newspaper Jan read, more than half of the young people in the U.S. believed that they could change their society.

⑦ Mari believes that voting is a way for people to express their opinions to the government and choose someone who supports them.

⑧ Ken likes plastic bags because they are free, and he does not want the government to make a law to stop their use.

ア	① ②	イ	① ③	ウ	② ③	エ	③ ⑥
オ	⑤ ⑦	カ	① ② ⑥	キ	① ③ ④	ク	② ④ ⑦
ケ	⑤ ⑥ ⑧	コ	⑤ ⑦ ⑧	サ	① ④ ⑥ ⑧	シ	② ④ ⑤ ⑦

〔問7〕 あなたが通っている中学校をさらに良くするために，どんなことを変えたり，改善してみたいと思いますか。このことについて**あなたの考え**を，**その理由**を含めて**40 語以上 50 語以内の英語**で書きなさい。「,」「.」「!」「?」などは語数に含めません。これらの符号は，解答用紙の下線部と下線部の間に入れなさい。

このページには問題はありません。

次のページに進みなさい。

次の文章を読んで，あとの各問に答えなさい。
（＊印の付いている単語・語句には，本文のあとに〔注〕がある。）

　　In the past, people looked at the stars and found the patterns of their movement. They watched day turn to night and back to day. They watched seasons come and go. They called these patterns "time." We find a lot of patterns in the world of nature and use them in our daily lives. But what do the patterns tell us? When scientists try to understand the patterns of our world, they often turn to a powerful tool, mathematics. They look at things in nature carefully and use mathematics to show how they work. They have tried to find *hidden rules behind things in nature and show them in mathematics. They have been impressed in finding that mathematics and the world are deeply connected with each other.
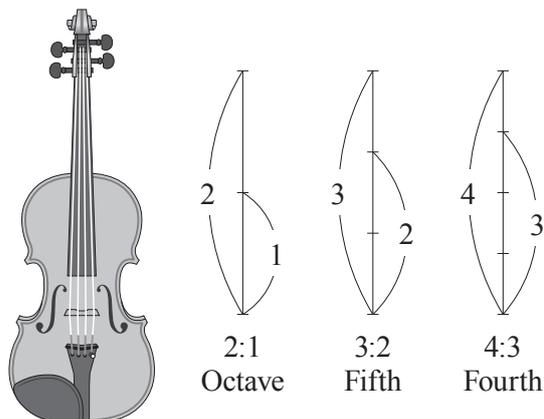
　　The world is full of *wonders. When we look at the world, we can find numbers all around us. Even music is a part of mathematics. About 2,600 years ago, *Pythagoras made a great discovery. He discovered patterns that connected the sounds of beautiful music to the *lengths of *vibrating *strings. When two sounds were played together, they produced a very beautiful harmony. He found three especially beautiful harmonies and called them an *octave, a fifth, and a fourth. Let's find out more. If a string makes the sound of "do," an octave can be produced with "do" and another "do" one octave higher. A fifth is produced with "do" and "so." A fourth is produced with "do" and "fa." Let's think about the length of each vibrating string. In an octave, the lengths of the vibrating strings create a *ratio of 2 to 1 （2:1）. In a fifth, the ratio is 3 to 2 （3:2）. In a fourth, the ratio is 4 to 3 （4:3）. （See **Picture A**.） With these nice, simple ratios, you can produce beautiful harmonies. When the lengths of the strings are not in a simple ratio, the sound is not beautiful. | 　　　　　1–a　　　　　 |
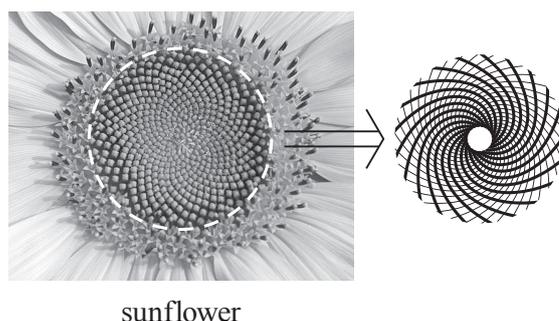This has made people's understanding of music better.

　　Let's think about another example. Think about flower *petals. Some flowers have 3 petals, and others have 5, 8, 13, 21, 34, 55, or 89 petals. These numbers are often seen in nature, especially in plants. Look at the center of a sunflower. You can see two *spirals, as in **Picture B**. The lines of one spiral go one way, and the lines of the other spiral go the other way. When one spiral in a small

Picture A

2:1
Octave

3:2
Fifth

4:3
Fourth

Picture B

sunflower

sunflower has 21 lines, the other spiral has 34 lines. A little bigger sunflower has spirals of 34 and 55 lines. An even larger sunflower has spirals of 55 and 89 lines. These numbers are called *Fibonacci numbers. They go like this, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, …. The numbers of lines in the spirals of a sunflower are always Fibonacci numbers that are next to each other. That pattern of Fibonacci numbers is always clear. You can get the next number by adding the two numbers before it. For example, $1 + 1 = 2$, $1 + 2 = 3$, $2 + 3 = 5$, $3 + 5 = 8$, $5 + 8 = 13$, $8 + 13 = 21$, and so on.

| 1-b |

But why do plants follow such a clear pattern? Do plants know numbers or math?   Do plants have little computers to create patterns? (2)Even today we still wonder why.
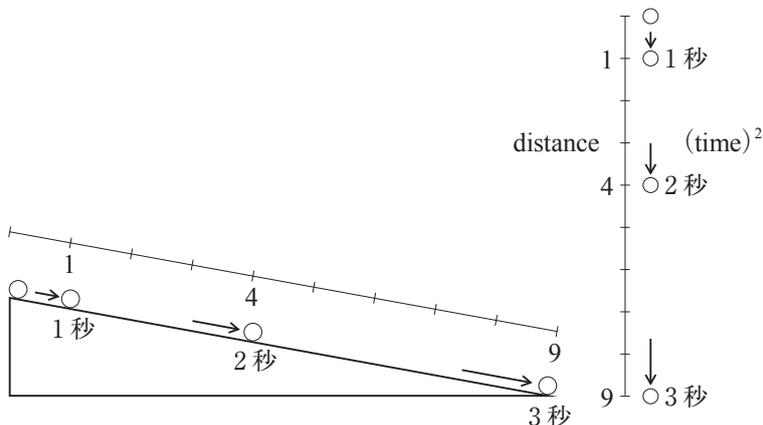
These numbers were introduced to Europe by an Italian scientist, Fibonacci, in the 13th century after he learned about them in North Africa. He also learned about a number system there and brought it back home. That system was $[0, 1, 2, 3, 4, 5, …]$.   It is the number system we usually use today. At that time, people in Europe had their own number system, $[Ⅰ, Ⅱ, Ⅲ, Ⅳ, Ⅴ, Ⅵ, …]$, but they found the number system introduced by him was much more useful than theirs. Soon people started to use it more than the other system.   For scientists, the new number system was very helpful, and they *developed mathematics with it. They were able to use the system to show hidden rules in nature more easily in mathematics, and (3)this helped to develop science and create our world of today.

Galileo Galilei was a great scientist in Italy in the late 16th century.   He looked at the patterns of falling balls carefully and showed them in mathematics. Before that, for centuries people believed heavy things always fell to the ground faster than lighter things.
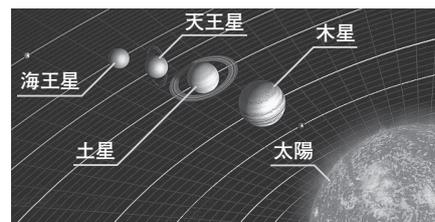
4

He wanted to know more. He wanted to know how they fell, but this was very difficult because they fell very fast. He came up with a great idea to make the movement slow. He built a slope like the one in **Picture C**. One side of the slope was high and the other side was low. He put a ball on the high side and watched it move down the slope. Here he found a pattern. The *distance of a fall is *proportional to the *square of the time of that fall. He showed this in a simple *equation. If you use

Picture C

Picture D

the equation, you can tell how far something will fall in a *certain time. His equation is still very useful today, and it works in every place in the *universe. It was used by scientists to take three people in the U.S. spaceship Apollo 11 to the moon in 1969. [1-c] This shows the power of mathematics.

Isaac Newton was another great scientist. He was born in England in the same year that Galileo died, 1642. In 1687, Newton wrote one of the greatest books in the history of science. Today it is known as "the Principia." In it, Newton showed the patterns of nature he found and used mathematics to explain them. In the fall of 1680, a *comet was seen from many places all over the world. Newton wanted to find how the comet traveled through the sky, so he gathered information to learn when, where, and how long people across the world could see it. He found some patterns, and finally learned how the comet moved through the sky. He also found that the *force moving the comet around the sun was the same force pulling a falling ball to the ground. [1-d] The force even held the planets in their places around the sun. The force was called "*gravity." He showed it in a simple equation to explain how two things pull on each other. This equation is very important because, for the first time, it showed how gravity worked in every place in the universe. About 200 years ago when Uranus (*Tennousei*) started to go off track, scientists used the equation and found that another planet was pulling it. In this way, they discovered Neptune (*Kaiousei*). (See **Picture D**.) This is another example of the power of mathematics.

Galileo once wrote, (5)"The universe is written in the language of mathematics." When we look at the world, we cannot see numbers out there, but they are all around us. They are waiting to be seen through the eyes of mathematics. The power of mathematics is amazing. Without mathematics, our world of today would be very different. Scientists have created a lot of equations. Those equations are actually used in our daily lives. This has helped to make many amazing things, such as airplanes, spaceships, computers, Wi-Fi, and GPS. (6)Mathematics is an important tool for both [6-a] the world of nature and [6-b] a lot of new and wonderful things in today's world.

〔注〕 hidden　隠された　　　　　wonder　不思議
　　　Pythagoras　ピタゴラス（古代ギリシャの数学者）　　　　　　length　長さ
　　　vibrate　振動する　　　　string　弦　　　　　　　　　octave　オクターブ
　　　ratio　比　　　　　　　　petal　花びら　　　　　　　spiral　らせん形
　　　Fibonacci numbers　フィボナッチ数　　　　　　　　　develop　発展させる
　　　distance　距離　　　　　　proportional to ～　～に比例して　square　二乗
　　　equation　方程式　　　　　certain　ある特定の　　　　universe　宇宙全体
　　　comet　彗星_{すいせい}　　　　　　force　力　　　　　　　　　gravity　重力

〔問１〕　本文の流れに合うように，| 1-a |～| 1-d |
に英文を入れるとき，最も適切なものは，次の中ではどれか。ただし，それぞれの
選択肢は一度しか使えないものとする。

ア　This was more than three hundred years after Galileo made his equation.

イ　It was the same force behind Galileo's equation for falling balls.

ウ　That's a wonder of nature we find in plants.

エ　The hidden rules behind wonderful harmonies are shown by these numbers.

〔問２〕　(2)Even today we still wonder why. とあるが，その内容を次のように書き表すとすれ
ば，| (2) | に入る最も適切なものは，下の中ではどれか。

Even today we still wonder why | (2) |

ア　plants have little computers to count numbers and create patterns in nature.

イ　some sunflowers make two spirals with each of their flower petals, but others don't.

ウ　plants often follow Fibonacci numbers, as we can see in the numbers of flower petals and
lines of the spirals in the center of a sunflower.

エ　there are special patterns of numbers in beautiful harmonies, but not in the flower petals
or the spirals of a sunflower.

〔問３〕　(3)this helped to develop science and create our world of today. とあるが，その内容を
次のように書き表すとすれば，最も適切なものは，次の中ではどれか。

ア　People tried hard to learn about both the new number system and their old system.
Thanks to this, a lot of people understood mathematics well and made a lot of equations.
So now people can enjoy music, science, and mathematics.

イ　Because of the number system Fibonacci introduced to Europe, most people became
interested in mathematics and tried hard to find numbers in nature. So now we can enjoy
music, study plants and mathematics, and fly in the sky.

ウ　As the new number system and Fibonacci numbers were very interesting to learn, people
started to study them hard and made a lot of equations. Because of this, we can now enjoy
traveling by plane and using Wi-Fi, GPS, and so on.

エ　Because of the number system introduced to Europe, scientists could write down patterns
in nature more easily in mathematics and made a lot of equations. People have used them
in science and created useful things, such as spaceships and Wi-Fi.

〔問4〕 ┌─────── 4 ───────┐ の中には次の①〜⑤の文が入る。本文の流れに合うように正しく並べかえたとき，その組み合わせとして最も適切なものは，下の**ア〜カ**の中ではどれか。

① They fell faster and faster as they got closer to the ground.

② However, he showed this was wrong.

③ He found they hit the ground at the same time.

④ While he was watching the falling balls, he found another thing.

⑤ He dropped two different balls, a heavy ball and a lighter one, from a high tower.

ア	② → ③ → ④ → ⑤ → ①
イ	② → ④ → ① → ③ → ⑤
ウ	② → ⑤ → ③ → ④ → ①
エ	⑤ → ① → ③ → ② → ④
オ	⑤ → ③ → ② → ① → ④
カ	⑤ → ④ → ① → ② → ③

〔問5〕 (5)"The universe is written in the language of mathematics." とあるが，その内容を次のように書き表すとすれば，┌ 5-a ┐ 〜 ┌ 5-c ┐ の中にどのような英語を入れるのがよいか。それぞれ**ア〜カ**の中から**一つずつ選べ**。

We can learn about the universe by finding the ┌ 5-a ┐ of ┌ 5-b ┐ around us and by showing them in ┌ 5-c ┐ .

ア distance　　　　イ patterns　　　　ウ system
エ force　　　　　オ mathematics　　カ numbers

〔問6〕 下線部 (6) の空所，┌ 6-a ┐ ，┌ 6-b ┐ に，英語を入れるとき，最も適切なものは，それぞれ下の**ア〜エ**の中ではどれか。

(6)Mathematics is an important tool for both ┌ 6-a ┐ the world of nature and ┌ 6-b ┐ a lot of new and wonderful things in today's world.

┌ 6-a ┐　ア giving　　イ feeling　　ウ making　　エ understanding
┌ 6-b ┐　ア creating　イ changing　ウ opening　エ helping

― 13 ―

〔問7〕 次の（A），（B）について，本文の内容に合う英文の組み合わせとして，最も
適切なものは，それぞれ下の**ア～シ**の中ではどれか。

（A）

① When two sounds are played together with the lengths of vibrating strings in a ratio of two to one, a beautiful harmony called a fifth is produced.

② When there are 55 lines going one way in one spiral, there will be 34 or 89 lines in the other spiral.

③ The number system people in Europe used was much more useful than the number system Fibonacci introduced to them.

④ A slope like the one in Picture C was built to make the movement of a falling ball slow and find how it falls.

⑤ When Neptune（*Kaiousei*）started to move in a different way, scientists used the equation Newton made and found a new planet.

ア	① ②	イ	① ③	ウ	① ④	エ	① ⑤
オ	② ③	カ	② ④	キ	② ⑤	ク	③ ④
ケ	③ ⑤	コ	① ② ③	サ	② ④ ⑤	シ	③ ④ ⑤

（B）

① About 2,600 years ago, Pythagoras found that when two sounds were played together in a simple ratio, a very beautiful harmony was produced.

② An Italian scientist, Fibonacci, found that there were clear patterns in plants and made Fibonacci numbers. Also, he made the number system we usually use today.

③ Galileo believed that people could go to the moon in the future because he showed his equation would work even in the universe.

④ Newton was able to find how the comet moved through the sky after gathering a lot of information on the comet from all around the world and finding the patterns in it.

⑤ Newton made a simple equation to show how two things pull on each other, and also found that gravity worked in the same way in space as here on Earth.

ア	① ②	イ	① ③	ウ	① ④	エ	① ⑤
オ	② ③	カ	② ④	キ	② ⑤	ク	③ ④
ケ	③ ⑤	コ	① ③ ④	サ	① ④ ⑤	シ	② ③ ⑤

青

英

詩