Ⅰ. 次の英文を読み，下記の設問に答えなさい。

Attitudes toward time differ from country to country and culture to culture. Latin Americans, for example, are customarily later than the times announced or scheduled for appointments and parties, though how late (ア) with the occasion and the particular country. In contrast, Germans and Swedes and Americans from the northern states expect people to arrive precisely on time and will sometimes stand outside a door (イ) at their watch until the exact moment to knock or ring the bell. Consequently, anyone who hopes to do business abroad or simply demonstrate good manners while traveling around the globe (ウ) to learn new codes of etiquette to fit in with local custom. Learning local time custom will not only flatter your hosts and make your visits more pleasant, but will also make you a good ambassador abroad; (1) instead of causing embarrassment, misunderstanding, and offense, you will demonstrate your respect for your host culture and your own international aptitude.

Although you yourself must learn what is polite in terms of time in any given place, it helps to have some general guidelines for wide areas. In the main, northern areas are 〔 X 〕 precise about time and southern areas less. A dinner invitation for seven o'clock in Chicago, which has a strong northern European influence, means that you must arrive at or 〔 Y 〕 that time, while a dinner invitation for seven in New Orleans, which has a strong Italian, Spanish, and French influence, means you should come sometime between 7:15 p.m. and 8 o'clock. In Sweden, a 7 p.m. invitation means a 7 p.m. arrival time, while in Mexico a 7 p.m. invitation means 〔 Z 〕 before 7:30 or 8 p.m. and a 7 p.m. party invitation might mean "Come around 10 or 11 p.m." Americans who are invited to a Mexican party scheduled for 7 p.m. and

who arrive at 8 p.m. might find themselves the first guests of the evening. Standard Bombay expected arrival time is also 15 or 30 minutes later than the time (エ), buy rarely as late as the Mexican expected arrival time. (2)In Arab countries, in contrast, a dinner invitation might be incredibly flexible; in fact, in some rural areas it might mean, "show up sometime on the invited day" if it is for a celebration. In other words, you should find out what the local custom of time and invitation (オ) before you set out for dinner or a party.

—A. Macdonald & G. Macdonald (1996): *Mastering Writing Essentials*

問 1 下線部(1)と(2)を日本語になおしなさい。

問 2 本文の空所(ア)から(オ)にそれぞれ入る最も適当な動詞を次の中から選び，文脈に応じ適切な形(現在形・現在分詞形・過去分詞形のいずれか)に変えなさい。

give　　involve　　need　　stare　　vary

問 3 本文の空所〔 X 〕，〔 Y 〕，〔 Z 〕に入れるのに最も適当な語を，本文の中からそれぞれ1語ずつ選んで，書きなさい。

Ⅱ. 次の英文を読み，下記の設問に答えなさい。

Men are generally better than women at finding their way in unfamiliar settings, and use different parts of the brain to do it, a study suggests. As for why men can't seem to ask for directions, however, that will have to await another study. The findings add a biological counterpart to prior research that indicated men and women tend to use different strategies to navigate.

(1) In the newer experiment, researchers scanned the brains of 12 men and 12 women as they tried to escape a three-dimensional virtual-reality maze*. The volunteers pushed buttons to move their virtual selves left, right or ahead. In the real world, that might be like trying to find a specific place in an unfamiliar city, said neurologist* Dr. Matthias Riepe of the University of Ulm in Germany. The men got out of the maze in an average of two minutes and 22 seconds, vs. an average of three minutes and 16 seconds for the women. That fits with previous studies in animals and people that suggest males navigate better in an unfamiliar environment.

The brain scans found that while both sexes used some of the same parts of the brain for the task, there were also some differences. Riepe and colleagues describe the results in the April issue of the journal *Nature Neuroscience**. One difference involved the hippocampus*, a banana-shaped structure deep in the brain that is crucial for navigation. Just last week, other scientists reported that male London taxi drivers show structural changes in the hippocampus, apparently because of their professional experience. People have a hippocampus in each side of the brain. Riepe's study found that both sexes used the right hippocampus in negotiating the maze. But only men used the left hippocampus. Conversely, women used an outer part of the brain called the right prefrontal cortex*, while men in the study didn't. That might reflect differences in how men and women handle information about the space around them, Riepe and colleagues said. Prior work suggests that women rely mostly on landmarks to navigate ("Turn right at the drugstore, then left at the grocery") while men lean toward using geometry, as one would figure from a map ("The museum should be over that way"). The women's activity in the cortex might reflect the effort of keeping landmark cues in mind, while the hippocampus activity

in the men might be needed for the geometric approach, the researchers said. Riepe said his study could not explore whether the brain differences are learned or biologically programmed. But he said he suspects the latter, because they also appear in rats.

Diane Halpern, a psychologist at California State University in San Bernardino and an expert on gender differences in thinking, noted that sex differences in brain activity have been observed for other tasks, such as reading. So it's not surprising to find another example, she said. Such differences probably result from both experience and programmed influences, because the brain changes in response to experience, Halpern said. She also stressed that women generally outperform men in some mental tasks—such as creating of a list of words that begin with a given letter—so one can't say that men are generally smarter than women.

Riepe said his study couldn't explain the popular notion that men (2) are more reluctant than women to ask for directions when lost. "That's a different story, I think," he said. —*USA TODAY*: *March 20, 2000*

*【注】 maze：迷路，neurologist：神経学者，*Nature Neuroscience*：科学誌の名称，hippocampus：海馬領域，prefrontal cortex：前頭葉皮質

問 1 下線部(1)の実験で被験者に与えられた課題を，40 字程度の日本語で具体的に説明しなさい。

問 2 本文中で，「知らない道を行く(目的地を見つける)際に，男性と女性では異なった方法を使う傾向がある，と以前の研究で指摘されている」とあるが，その違いを具体的に 40 字程度の日本語で説明しなさい。

問 3　神経学者 Riepe 博士の研究によれば，使われる脳の部位という点で男女間にどのような差異があると本文中で述べられているか，60 字程度の日本語で書きなさい。

問 4　心理学者 Diane Halpern が文中であげている，女性が一般に優れている精神活動の具体例を日本語で書きなさい。

問 5　下線部(2)を日本語になおしなさい。

Ⅲ. 次の英文を読み，下記の設問に答えなさい。

A square with 9, 16, 25, ⋯, n^2 boxes, called cells, filled with integer numbers*—all different—is called a "magic square" if the sums of the numbers in the horizontal rows, vertical columns, and main diagonals are all equal.

The magic square is (ア) Chinese origin, being first mentioned in a manuscript from around 2200 B.C. This square had $3 \times 3 = 9$ cells, each with Chinese characters equivalent to 1 through 9, and giving the sum 15 in all directions: $4 + 9 + 2 = 3 + 5 + 7 = 8 + 1 + 6 = 15$ along all the three rows, $4 + 3 + 8 = 9 + 5 + 1 = 2 + 7 + 6 = 15$ along all the three columns, and $4 + 5 + 6 = 2 + 5 + 8 = 15$ along the two main diagonals* as shown in the following figure.

四	九	二
三	五	七
八	一	六

It was inevitable that a square with these "magical", and therefore mysterious, quantities should appeal to astrologers* and cranks* of all

descriptions. Thus, a square of one cell [contain](1) a digit 1—exhibiting the magic of [produce](2) the sum 1 in all directions—was considered to represent the eternal perfection of God (=Number One), as [explain](3) to the lay* mind by *Cornelius Agrippa* (1486—1535), an astrologer (イ) profession. The unfortunate fact that a magic square with $2 \times 2 = 4$ cells cannot be [construct](4) was [consider](5) proof of the imperfection of the four elements, i.e., air, earth, fire, and water, in the Middle Ages.

If the integers in a magic square are the consecutive numbers from 1 to n^2, the square is said to be of the n-th order, and the magic number is equal to $n(n^2 + 1)/2$. The simplest magic square possible is one of the 3rd-order, which is already shown in the above figure.

There are many ways to construct n by n magic squares. If n is even*, the procedure is far (ウ) straightforward. If n is odd*, the following simple procedure can be used to construct n-th order magic square:

1. Place a 1 in the cell beneath the central cell of the square.
2. Place all numbers from 1 to n^2 in the cell in order. Any given number is placed one cell below and one cell to the right of the last number. In this process, think of the square as a periodically repeated one. A cell beneath the bottom cell is equivalent to the top cell of the same column. A cell to the right of the last cell of a row is equivalent to the first cell to the left in the same row.
3. During the process of generating numbers, there may be a number already occupying the cell for which you are aiming. The rule says to deposit the number two steps below the previous number in the same column of the square.

—J. Kappraff (1990): *Connections* & J. Gullberg (1996): *Mathematics*

＊【注】 integer number：整数，diagonal：対角線，astrologer：占星術師，crank：a peculiar person，lay：素人，even number：偶数，odd number：奇数

問 1　Magic Square は日本語では「方陣」あるいは「魔方陣」と呼ばれ，本文の最初に定義されています。これを受けて，“a magic square of *n*-th order”（*n* 次の魔方陣）に要求されている条件はどのようなものであるか，40 字程度の日本語で示しなさい。

問 2　本文の(ア)，(イ)，(ウ)にそれぞれ前置詞を書き入れなさい。

問 3　本文の〔　〕内の動詞(1)から(5)を適切な形にしなさい。

問 4　本文には，“odd-order”の *n* 次の魔方陣がある規則によって作られる方法が記されています。文中に示された方法に従って，5th-order の魔方陣を完成させなさい。