令和2年度　入学試験問題

医　学　部　(Ⅰ期)

英　語・数　学

注　意　事　項

1. 試験時間　令和2年1月24日，**午前9時30分から11時50分まで**
2. 配付した試験問題(冊子)，解答用紙の種類はつぎのとおりです。

(1)　**試験問題**(冊子，左折り)(表紙・下書き用紙付)

英　語

数　学(その1，その2)

(2)　**解答用紙**

英　語　　1枚(上端黄色)(右肩落し)

数　学(その1)　1枚(上端茶色)(右肩落し)

〃　(その2)　1枚(上端茶色)(左肩落し)

3. 下書きが下書き用紙で足りなかったときは，試験問題(冊子)の余白を使用して下さい。
4. 試験開始2時間以降は退場を許可します。但し，試験終了10分前からの退場は許可しません。
5. 受験中にやむなく途中退室(手洗い等)を望むものは挙手し，監督者の指示に従って下さい。
6. 休憩のための途中退室は認めません。
7. 退場の際は，この試験問題(冊子)を一番上にのせ，挙手し，監督者の許可を得てから，試験問題(冊子)，受験票，下書き用紙および所持品を携行の上，退場して下さい。
8. 試験終了のチャイムが鳴ったら，直ちに筆記をやめ，おもてのまま上から解答用紙〔英語，数学(その1)，数学(その2)〕，試験問題(冊子)の順にそろえて確認して下さい。確認が終っても，指示があるまでは席を立たないで下さい。
9. 試験問題(冊子)はお持ち帰り下さい。
10. 監督者退場後，試験場で昼食をとることは差支えありません。ゴミ入れは場外に設置してあります。
11. 午後の集合は1時です。

令和２年１月 27 日

受験者の皆様へ

昭和大学

令和２年度医学部一般選抜入試Ⅰ期一次試験における出題不備について(お知らせ)

令和２年１月 24 日に実施致しました医学部一般選抜入試Ⅰ期一次試験の「数学」において出題不備がありました。
受験者の皆様には大変ご迷惑をおかけ致しましたこと心よりお詫び申し上げます。
この件につきましては、下記のとおり対応致します。なお、本学と致しましては、この度の出題不備を十分に検証し今後同様の事が起きないよう努めて参ります。

出題ミスの内容

数学 11 ページ問題２(１)問題文

次の各問いに答えよ。ただし、答えは結果のみを解答欄に記入せよ。

(1) $a_1=\frac{1}{3}$, $a_{n+1}=\frac{2a_n}{3a_{n-1}}$によって定められる数列 $\{a_n\}$ の一般項を求めよ。また, $\lim_{n\to\infty} a_n$を求めよ。

上記問題において、正答が存在しない。

対応内容

当該問題については、問題に不備を確認したため、全員正解扱いとする。

英　語

1 次の各文の(　　)の中に入れるのに最も適切な表現を1つずつ選び，記号で答えなさい。

1. I do not think it is a good idea to try to memorize speeches (　　).

A. by each word
B. in so many words
C. word for word
D. by a word
E. in words

2. The party's victory in July's general election (　　) him to run for President.

A. prevented　B. relieved　C. persuaded　D. proceeded　E. assumed

3. He allowed his mind to (　　) for a while.

A. think　B. open　C. make up　D. wander　E. lose

4. The city is suffering from a huge budget (　　) due to the decrease in taxes.

A. account　B. deficit　C. deposit　D. finance　E. fund

5. (　　) a serious problem to arise, we would have to act cautiously.

A. If　B. Should　C. Were
D. In any case　E. Whenever

6. One more step, (　　) I would have fallen down the stairs.

A. otherwise　B. unless　C. so　D. and　E. or

7. My uncle said he would help me pay school fees, and he was as (　　) as his word.

A. honest　B. faithful　C. good　D. promising　E. demanding

8. He lost the election (　　) a margin of only 50 votes.

A. by　B. with　C. in　D. at　E. for

9. I'm sorry that I was late. I overslept this morning. I (　　) have called you.

A. must　B. cannot　C. should　D. hadn't　E. needn't

10. The guard did not (　　) me to enter the room.

A. forgive　　B. make　　C. let　　D. permit　　E. greet

11. (　　) should the house be left unlocked.

A. On no account　　B. On that account　　C. Of much account

D. On all accounts　　E. By all accounts

12. (　　) two hundred people attended my brother's funeral.

A. No more　　B. As much as　　C. So much

D. As long as　　E. As many as

13. Jane: I'd like to say something.

Mike: Of course, Jane, please (　　).

A. let me see　　B. wait for a moment　　C. come again

D. go ahead　　E. raise your head

14. Paul: That's a good idea. All those (　　) Maria's proposal, say "Yes."

A. who agrees　　B. in favor of　　C. in line with

D. in accordance with　　E. on the side of

15. John: How was your flight?

Mary: Very pleasant. Thank you for picking me up.

John: (　　). Let me help you with your luggage.

Mary: Oh, thank you. That's very kind of you.

A. I'm glad to hear that　　B. No problem　　C. Quite a bit

D. I'd love to　　E. Perfect

2 文章を読んで，後の問題に答えなさい。

[1] Japanese teens are lagging behind many other countries in well-being and happiness. That is one of the conclusions of a new report on educational well-being recently published by the Organisation for Economic Co-operation and Development — with the key finding that out of 35 OECD countries, only South Korean and Turkish teens rated their life satisfaction lower than Japanese young people.

[2] Japanese teens were also above average on overall anxiety indicators and well below average for motivation to succeed in school. This finding, part of a survey of 540,000 15-year-olds in 72 countries, indicates a worrying pattern throughout the world: Advanced economies have lower levels of well-being than might be expected from their material prosperity and freedoms — particularly among young people.

[3] The OECD's report is just the latest in an emerging literature of global youth studies on this issue. Last year, the Varkey Foundation published the "Generation Z: Global Citizenship Survey" about the attitudes of young people aged 15 to 21 in 20 major countries.

[4] Although the report found that young people globally had a largely internationalist and liberal outlook, it also showed that young people in Japan had the lowest mental well-being of all countries surveyed — particularly worrying (ア) that the figures for 2014 gave suicide as the leading cause of death among Japan's 10- to 19-year-olds.

[5] Japanese young people were also found to have the lowest level of net* happiness of all 20 countries polled, and more Japanese young people said [ ].

[6] On any interpretation, these findings give cause for concern — prompting the urgent question of how the well-being of Japanese teens can be improved. It emerges that the picture (1) is complex and the answers not obvious.

[7] First, the findings of the OECD report show that the level of educational achievement, the amount of time children spend studying and the frequency of testing are all (イ) of well-being. In other words, none of these factors in themselves contribute to low well-being among children. Instead, the report suggests that it is the context in which education is facilitated and supported that is important.

[8] One key finding is that students whose parents reported spending time talking to their child daily or eating a main meal with their child at the table were between 22 percent and 39 percent more likely to report high levels of life satisfaction. Victimization of bullying is also less frequently reported by students who said that they receive parental support when facing difficulties at school. In addition, students in schools with above-average

levels of well-being reported much more support given by teachers than those in schools with below-average well-being.

[9] Clearly, support in facing the challenging environment of school plays a significant role in well-being. But there are good reasons to think that additional factors are in play, and the Generation Z report (ウ) the context of these OECD findings.

[10] The report measured youth satisfaction on a wide range of metrics*, including happiness with life, mental well-being and emotional well-being, and (エ) found that young people in four countries — China, India, Nigeria and Indonesia — placed consistently at or near the top of the satisfaction scale for all three areas.

[11] Why? Three main factors were discovered. First, China, Indonesia and India also had the strongest family relationships — which raises the possibility that overall well-being may be a function* of a child's general relationship with family, rather than simply as it relates to school support.

[12] Second, of all countries surveyed, only China, Indonesia, India and Nigeria thought overall that the world was not becoming a worse place. Related to this, it was also clear that the top countries for well-being tended to be (オ) economies. It may be that perceived opportunities for expansion has a positive impact on well-being. Meanwhile, in advanced economies like Japan's, there may be a dimly* discernible* sense that the economy has "peaked" and that there is little room to advance.

[13] Closely connected clues to the reason for Japan's low mental well-being are found in some of the other Japanese youth responses. Japanese teens reported that "working hard/helping myself get on in life*" was their most important value — and more chose this than in any other country except South Korea.

[14] Japanese teens were also the least likely of all 20 countries to think that making a contribution to wider society was important. It is easy to see how these beliefs, in combination with a lack of opportunity, could produce a pessimistic (2) state about one's chances of leading a successful or meaningful life.

[15] While we can do little as individuals to affect the state of the economy, it is possible to consider how our family relationships, the demands of our culture and education system, and our opportunities for rest, impact our well-being. Happiness may not be reducible to a list of prescriptive conditions (3), but there is considerable room for evidence-based policy to guide Japanese institutions in promoting well-being as much as possible, and seeking to cushion the impact of areas that remain outside their influence.

(2017年5月1日付The Japan Times 掲載、Vikas Pota、"Why are Japanese teens so glum?")

NOTES

net (adj.): final, after all the important facts have been included

metrics: a system or standard of measurement

function: a thing dependent on another factor or factors

dimly: not very brightly or clearly

discernible: to be perceptible

get on in life: to be successful in one's life

glum: sad, quiet and unhappy

1. 本文中の(ア)～(オ)に入るのに最も適切なものを，それぞれ①～⑤の中から1つずつ選んで，番号で答えなさい。

(ア)	①	given	②	providing	③	including		
	④	assumed	⑤	supposing				
(イ)	①	irrelevant	②	regardless	③	indispensable		
	④	independent	⑤	reliable				
(ウ)	①	takes account of	②	throws light on	③	loses track of		
	④	makes up for	⑤	keeps up with				
(エ)	①	probably	②	unexpectedly	③	deliberately		
	④	obviously	⑤	importantly				
(オ)	①	centralized	②	closed	③	consumer		
	④	declining	⑤	emerging				

2. 次の[ ]内の語句を意味が通るように並べ替えて，第5段落の空欄に入れたときに，5番目と8番目に来る語または句を書きなさい。

[any / apart / were / they / from / country / than / other / South Korea / unhappy]

3. 第6段落の下線部(1)とほぼ同じ意味になるものを①～⑤の中から1つ選んで，番号で答えなさい。

① the description ② the mental image or memory

③ the profile ④ the situation ⑤ the evidence

4. 第14段落の下線部(2)の語の反意語を英語で書きなさい。

5. 第15段落の下線部(3)の意味に近いと思われるものを選択肢から1つ選び，記号で答えなさい。

A．幸福になるための処方薬のリストを出すことはできないだろう

B．幸福になるための条件をリストにして処方することはできないかもしれない

C．幸福になるためにはこうしたらよいという条件を一覧にまとめることはできないかもしれない

D．幸福とはどのような状態なのかを一枚の処方箋で示すことはできないだろう

6. 次の中から本文の内容にあっているものを2つ選び，記号で答えなさい。

A．According to a new report published by OECD, Japanese teens rated their life satisfaction lowest among 35 OECD countries.

B．According to the new report, the youth in developed countries have lower levels of happiness than might be expected from their material prosperity and freedoms.

C．The statistics showed that suicide is not a major cause of death among Japan's 10- to 19-year-olds.

D．The result of the survey showed that students tend to become victims of bullying no matter how much parental support they receive when facing difficulties at school.

E．The report tells us that students in schools with above-average levels of well-being reported much more support given by teachers than those in schools with below-average levels of well-being.

F．According to the survey, it seems that teens in Japan perceived opportunities for expansion in the future and thus thought that the world was becoming a better place.

3 文章を読んで，後の問題に答えなさい。

[1] The innate* ability to estimate quantities is impaired* in children who have a math learning disability, according to a new report. The study also found that those who do poorly in math but aren't considered learning disabled struggle with math for different reasons.

[2] People with math learning disability, also known as dyscalculia, have difficulty understanding math concepts and solving even simple math problems despite adequate education. About 10% of school-age children have persistent* and significant difficulties with math, while many more fail to reach basic levels of mathematics achievement. The causes of dyscalculia, however, remain poorly understood.

[3] To learn more, researchers decided to explore the relationship between children's mathematics achievement and their innate ability to estimate and compare quantities without counting. This capability, referred to as (1)the approximate number system (ANS), is normally present in infants and improves with age. We rely (ア) ANS skills in daily life, such as when we estimate which line will move more quickly at the grocery store.

[4] The researchers gave 71 ninth graders* 2 series of tests designed to measure their ANS skills. For the first series, the children viewed groups of dots and were asked to say whether there were more blue or yellow dots. In the second, 9 to 15 dots of one color appeared, and the children were asked how many dots they saw. (2)Each screen was visible for only a ( ) of a second, so the children didn't have time to count the dots. Each series of tests consisted (イ) dozens of screens.

[5] The students' math abilities had been tested at regular intervals since kindergarten. The scientists classified the children (ウ) 4 groups based on these math achievement scores: high achieving (above the 95th percentile*), typically achieving (25th to 95th percentile), low achieving (11th to 25th percentile) and math learning disabled (10th percentile and below). The research was conducted by Dr. Michèle Mazzocco at the Kennedy Krieger Institute and Johns Hopkins University and her colleagues Drs. Lisa Feigenson and Justin Halberda of Johns Hopkins University. It was funded in part by NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

[6] In the advanced online edition of *Child Development* on June 16, 2011, the researchers reported that math learning disabled students had the poorest ANS scores. This finding suggests that problems with the ANS may underlie math difficulties for children in this

group. However, low-achieving children were no (　a　) likely to have poor ANS scores (　b　) children in the higher achieving groups.(3) Math difficulties in low-achieving children, then, likely stem* from a cause or causes distinct from the ANS.

[7] "Children with mathematical learning difficulties are often viewed as a uniform group of students, for whom a single type of special instruction or math curriculum is appropriate," Mazzocco says. "Our findings suggest, however, that children have difficulty with math for different reasons."

[8] Research to identify these reasons may now lead (　エ　) new ways of identifying children (　オ　) risk and tailoring* teaching methods to help them.

NOTES

innate　生まれつきの　　**impaired**　(正常な機能が)損なわれた

persistent　永続的な　　**ninth grader**　9年生(日本の中学3年生に相当)

percentile　パーセンタイル値(データを小さい順に並べたときに，小さい方からそのパーセントに位置する値のこと。たとえば，中央値は50パーセンタイル値である。)

stem　…に起因する　　**tailor**　…を(特別の目的のために)合わせる

1.　第3段落の下線部(1)の定義を，句読点も含めて40字以内の日本語で書きなさい。

2. 第4段落の下線部(2)の文意が通るようにするために，空欄に入れる語として適切なものを次から1つ選び，記号で答えなさい。

A. portion　　B. fraction　　C. segment　　D. section　　E. timing

3.　第6段落の下線部(3)が次の日本語訳のような意味になるように，空欄(　a　)と(　b　)に入れるのに適切な英単語を1語ずつ答えなさい。

日本語訳：しかしながら，数学の成績が下から二番目に悪い子どもたちは，より成績の良いグループの子どもたちと比べてANSのスコアが低いわけではなかった。

4. (　ア　)～(　オ　)に入る英単語を選択肢から選んで，記号で答えなさい。なお，各選択肢は一度しか使用できません。

選択肢：A. with　　B. on　　C. over　　D. to　　E. of

F. by　　G. into　　H. in　　I. for　　J. at

5. 次の中から本文の内容にあっているものを2つ選び，記号で答えなさい。

A. The reasons for math learning disability are already fully identified.

B. Less than 10% of school-age children fail to reach basic levels of mathematics achievement.

C. People in general do not use ANS skills in their daily lives.

D. The ANS normally improves as we get older.

E. It was suggested in the new report that math difficulties in low-achieving children are likely to arise from a cause or causes that are different from the ANS.

F. The researchers concluded that children with mathematical learning difficulties can be viewed as a uniform group of students, for whom a single type of special instruction or math curriculum is suitable.

数　学（その１）

1　次の各問いに答えよ。ただし，答えは結果のみを解答欄に記入せよ。iは虚数単位とする。

座標平面において，原点をOとする。座標平面上の点A$(x,\ y)$を複素数A(z)(ただし$z = x + iy$)に移す操作をXとする。また，複素数A(z')(ただし$z' = x' + iy'$)を座標平面上の点A$'(x',\ y')$に移す操作をYとする。

(1)　座標平面上の原点，および2点B$\left(\dfrac{\sqrt{6}+\sqrt{2}}{2},\ \dfrac{\sqrt{6}-\sqrt{2}}{2}\right)$，C$(\sqrt{6}-\sqrt{2},\ \sqrt{6}+\sqrt{2})$からなる三角形を△OBCとする。$\overrightarrow{\mathrm{OB}}$と$\overrightarrow{\mathrm{OC}}$がなす角をラジアン単位で求めよ。また，△OBCの面積を求めよ。

(2)　BCの中点をMとする。操作Xによって B，C，Mから複素数β，γ，μが得られたとき，β，γ，μを複素数平面の原点周りに$-\dfrac{\pi}{4}$回転させて得られる複素数β'，γ'，μ'を求めよ。

(3)　β'，γ'，μ'を操作Yによって座標平面に移した点をB′，C′，M′とする。x軸とOM′がなす小さい方の角をθとするとき，$\sin\theta$と$\cos\theta$の値をそれぞれ求めよ。

(4)　操作XとYを組み合わせて△OBCを原点O周りに回転させるとする。△OBCの面積がy軸で二等分されるとき，Bに対応する点をB″，Cに対応する点をC″とした場合，B″C″を通る直線の方程式を求めよ。

2 次の各問いに答えよ。ただし，答えは結果のみを解答欄に記入せよ。

(1) $a_1 = \dfrac{1}{3}$，$a_{n+1} = \dfrac{2a_n}{3a_{n-1}}$ によって定められる数列$\{a_n\}$の一般項を求めよ。また，$\lim_{n \to \infty} a_n$ を求めよ。

(2) $a_1 = \dfrac{1}{3}$，$(2n+1)a_n = (2n-3)a_{n-1} (n \geqq 2)$ によって定められる数列$\{a_n\}$の一般項を求めよ。また，$\lim_{n \to \infty} a_n$ を求めよ。

(3) 次の条件によって定められる数列$\{a_n\}$の一般項を求めよ。また，$\lim_{n \to \infty} a_n$ を求めよ。

$$a_1 = 1,\ a_2 = \frac{1}{2},\ a_{n+2} = \frac{1}{2}a_{n+1} + \frac{1}{8}a_n$$

数　学（その２）

3 次の各問いに答えよ。ただし，答えは結果のみを解答欄に記入せよ。

(1) 双曲線 $\frac{x^2}{9}-\frac{y^2}{16}=-1$ について

(1-1) 焦点の座標を求めよ。

(1-2) 漸近線の方程式を求めよ。

(2) ２つの袋A，Bがある。Aには赤球４個，白球３個，Bには赤球３個，白球４個が入っている。ただし，(2-1)のあとも(2-2)のあとも，それぞれの球は元の状態に戻すものとする。

(2-1) Aから球を１個取り出してBに入れ，次にBから球を１個取り出したとき，それが赤球である確率を求めよ。

(2-2) Aから球を１個取り出してBに入れ，次にBから球を１個取り出す。さらにAから球を１個取り出してBに入れ，Bから球を１個取り出す。このとき，Bから取り出した球２個がともに赤球である確率を求めよ。

(2-3) Aから球を２個取り出してBに入れ，次にBから球を２個取り出す。このとき，Bから取り出した球２個がともに赤球である確率を求めよ。

4 次の各問いに答えよ。ただし，答えは結果のみを解答欄に記入せよ。

(1) $y = \log_3(5x - 7)$ を微分せよ。

(2) 任意の自然数 n に対し，関数 $f(x)$ が

$$\int_{n-1}^{n} f(x)\,dx = n$$

を満たすとき，

$$\int_{1928}^{2020} f(x)\,dx$$

の値を求めよ。

(3) 2つの曲線

$$y = 2\sqrt{1 - \frac{x}{7}}$$

および

$$\sqrt{\frac{x}{7}} + \sqrt[3]{\frac{y}{2}} = 1$$

によって囲まれた図形を x 軸のまわりに回転してできる立体の体積を求めよ。