2022학년도
재외국민과 외국인 특별전형 수강능력시험

자연계열

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Directions for questions 1~25: In this part you will read a selection of English texts. Each text is followed by one or more questions. Choose the best answer for each question and mark the number (1), (2), (3), (4), or (5) on your answer sheet.

[Question 1]

> Villages speckle the slopes of Mount Merapi, where fertile land ___[1]___ farmers into a volcanic hazard zone. Although volcanic soils cover just one percent of the Earth's land surface, they support roughly 10 percent of its population.

1. Which best fits into the blank [1]? **[1.5점]**
(1) contributes   (2) dedicates   (3) inhabits   (4) attracts   (5) retrieves

[Question 2]

> La Poile fisherman Ross Francis hauls in a net full of baitfish. Once back at the wharf, he will freeze them for later use on the long lines that commercial fishers here use to catch cod and halibut. Always at the mercy of wind and waves, fishermen must now ___[2]___ with stricter rules governing their catches.

2. Which best fits into the blank [2]? **[1.5점]**
(1) encourage   (2) base   (3) contend   (4) object   (5) remedy

[Question 3]

> Carefully managed fires sweep across the Fling Hills in spring, preparing the ground for a surge of fresh growth that once nourished vast populations of bison and now fattens valuable herds of cattle. A tool deliberately wielded by Indians, ranchers, and conservationists, fire is as ___[3]___ to the health of the tallgrass ecosystem as water and air.

3. Which best fits into the blank [3]? **[1.5점]**
(1) burdensome   (2) crucial   (3) perilous   (4) terrifying   (5) trivial

[Questions 4-5]

> Our planet began as an elemental place of rock and gases, where the sun was fainter than now and the moon orbiting at less than a tenth of its current distance looked ___[4]___. Hundreds of millions of years passed before the planet was fit for life. But here and there, scenes on today's very different Earth ___[5]___ its harsh beginnings.

4. Which best fits into the blank [4]? **[2.1점]**
(1) gloomy   (2) immense   (3) remote   (4) abstract   (5) tiny

5. Which best fits into the blank [5]? **[1.5점]**
(1) suppress   (2) bind   (3) erase   (4) resume   (5) evoke

[Question 6]

> Nearly 20 years after its launch, Hubble continues to reveal ever greater wonders and fuel ever deeper questions about the universe. Occasional repair missions have allowed scientists to add new technology to the array of cameras and sensors. In 2002, astronauts equipped Hubble with the Advanced Camera for Surveys(ACS), ___[6]___ the telescope's discovery efficiency tenfold. In January 2007, an electrical short rendered parts of the camera useless. Another shuttle mission, scheduled for fall 2008, is planned to repair the camera and add new components, extending Hubble's extraordinary mission.

6. Which best fits into the blank [6]? **[1.5점]**
(1) aggravating   (2) eliminating   (3) boosting   (4) degrading   (5) irritating

[Questions 7-8]

> ___[7a]___ for a day of ice climbing, students test their skills on a glacier ___[7b]___ the Mer de Glace, one of the largest glaciers in the Alps. It extends eight miles (12 kilometers) on the northern side of Mont Blanc near Chamonix, France. Like other glaciers throughout the Alps, this one is ___[8]___. If current trends hold, scientists predict that fifty to eighty percent of remaining Alpine glaciers could vanish by 2100.

7. Which best fits into the blank [7a] and [7b]? **[2.1점]**

	[7a]		[7b]
(1)	outfit	……	name
(2)	outfit	……	named
(3)	outfit	……	naming
(4)	outfitted	……	named
(5)	outfitted	……	naming

8. Which best fits into the blank [8]? **[2.1점]**
(1) shrinking   (2) advancing   (3) refraining   (4) dwelling   (5) inflating

[Questions 9-10]

> Hunters wake up early for the opening day of pheasant season in Eureka, South Dakota. The hunting tradition still links friends, families, and canine companions to the seasons of the heartland. Dating to a time <u>when</u> hominine ancestors pursued <u>game</u> in order to live, hunting has become an important source of income for places such as Eureka, <u>where</u> gunners spend for motel space, meals, fuel, ammunition, and licenses, all of which help ___[10]___ the economy. Across the nation, some 12.5 million hunters spend 6.7 billion dollars on trips each year, 5.4 billion dollars on hunting <u>equipments</u>, and five billion dollars on other hunting-related <u>goods</u>.

9. Which of the underlined words is grammatically <u>incorrect</u>? **[2.1점]**
(1) when   (2) game   (3) where   (4) equipments   (5) goods

10. Which best fits into the blank [10]? **[2.1점]**
(1) lift   (2) decline   (3) collapse   (4) rise   (5) plunge

[Questions 11-12]

> If luxury-brand autos and SUVs are the most visible things on Saudi Arabia, a close second may be non-Saudi chauffeurs. Women are not permitted to drive in Saudi Arabia, so opportunities ___[11]___ for immigrants willing to take mothers shopping and daughters to school.
>
> Neither Saudi legislation nor Muslim tradition actually <u>forbids</u> women to drive. Deep in the kingdom's deserts, away from police, women often get behind the wheel. Yet female drivers in urban areas are routinely arrested. In 1991 protests against the ban met with swift government action. Protesters' passports were confiscated, and few dared <u>speak</u> up after that. Recently, though, women's groups have petitioned Saudi's King Abdullah to consider <u>changing</u> the policy. Advocates point out that mobilizing <u>half the country's</u> population would offer great economic benefits. Permission to drive would be a triumphant step for Saudi women. It might also be a brave one; according to one report, 81 percent of deaths in Saudi Ministry of Health hospitals <u>is</u> related to car accidents.

11. Which best fits into the blank [11]? **[2.1점]**
(1) deny   (2) inhibit   (3) permit   (4) mistake   (5) abound

12. Which of the underlined expressions is grammatically <u>incorrect</u>? **[2.8점]**
(1) forbids   (2) speak   (3) changing   (4) half the country's   (5) is

[Questions 13-14]

A star is a massive body of plasma, an ionized gas in outer space while a planet, in general, is a large object in orbit around a star. Unlike a planet, from which most light is reflected, a star emits light because of its intense heat.

Stars can be divided by different sizes and colors. Big stars are known as "giants" or "supergiants" while medium to small-sized stars are called "dwarfs." There are white dwarfs, yellow dwarfs, blue giants, red supergiants, brown giants, etc. Since stars burn at different temperatures and speeds, this affects their color. The sun is called a "yellow dwarf" since it burns at a medium temperature and thus creates a yellow color.

[I] The rate at which stars burn affects not only the color of the stars but also their lifespan. **[II]** Stars that burn more quickly and at a higher temperature die earlier than other stars do. **[III]** The sun, burning at a medium temperature, will have a medium-length lifespan of about 10 billion years. **[IV]** At the end of its life, in approximately 5 billion years, it will grow to an enormous size, destroying the earth. **[V]**

13. According to the passage, what is the difference between stars and planets? **[2.1점]**
(1) Stars burn more quickly than planets do.
(2) Stars are generally bigger in size than planets.
(3) Stars release light while planets bounce it back.
(4) Stars burn at higher temperatures than planets do.
(5) A star revolves around a planet that does not revolve.

14. Where is the sentence below best placed in the above passage? **[1.5점]**

In contrast, stars which burn quite slowly have a by far longer lifespan.

(1) [I]　　　　(2) [II]　　　　(3) [III]　　　　(4) [IV]　　　　(5) [V]

[Questions 15-16]

Back in the early 1800s, vast herds of buffalo stretched as far as the eye could see. By 1850, there were about twelve million buffalo. By the mid-1870s, however, the buffalo had been hunted almost to extinction. The number of buffalo being killed for sport and for profit was astronomical. Some compared the boom in the buffalo hunt to the gold rush. The use of guns, a market for buffalo hide, the development of tanning buffalo hide, and the expansion of the railroad system all contributed to the sharp increase in buffalo hunting. In particular, in the 1870s, clothes made from buffalo skin became fashionable, and industrialists discovered that buffalo hides could be used for other purposes.

In the 1870s, homestead workers who suffered from difficult economic situation also rushed to hunt for buffalo in hopes of making money. Ironically, only a few succeeded because these people did not know how to properly sell off the buffalo's skin and how to use tanning methods. Despite these failures, the killing of buffalo continued. One ramification of this situation was that the supply of buffalo ___[16]___ demand and the price of buffalo hide fell.

15. What is the main topic of the passage? **[2.1점]**
(1) Buffalo rearing in the 1800s
(2) Increase in the demand for buffalo products in the early 1800s
(3) Homestead workers' success in hunting buffalo in the late 19th century
(4) Enormous profit from buffalo hunting in the late 19th century
(5) Buffalo hunting boom in the late 19th century

16. Which best fits into the blank [16]? **[1.5점]**
(1) exceeded　　(2) expelled　　(3) expanded　　(4) excelled　　(5) expended

[Questions 17-18]

A major type of forest, an area with a high density of trees, is the rainforest. Rainforests are characterized by high and constant rainfall, with 190 centimeters of minimum annual rainfall. Even though tropical dry forests, which are located at tropical latitudes, also occur in climates that are warm year-round and may receive several hundred centimeters of rain per year, they deal with long dry seasons lasting several months.

Rainforests are home to two-thirds of all the living animal and plant species on the planet. It has been estimated that many hundreds of millions of new species of plants, insects, and microorganisms are still undiscovered and as yet unnamed by science. Despite the growth of plants in a rainforest, the soil may be poor because high rainfall tends to leach out soluble nutrients. The growth of trees in a rainforest is restricted in many areas by the lack of sunlight at ground level. This makes it possible for people and other animals to walk through the forest. If the leaf canopy is destroyed or thinned for any reason, the ground is soon colonized by a dense tangled growth of vines, shrubs and small trees called jungle.

The seasonal droughts in tropical dry forests have great impact on all living things in the forest. Deciduous trees that lose all of their foliage predominate in most of these forests, and during a drought a leafless period occurs, which varies with the species type. Because trees lose moisture through their leaves, the shedding of leaves allows trees to conserve water during dry periods. The newly bare trees open up the canopy layer, enabling sunlight to reach ground level and <u>facilitate</u> the growth of thick underbrush.

17. Which of the following is <u>opposite</u> in meaning to the underlined word "facilitate"? **[1.5점]**
(1) alleviate   (2) promote   (3) flourish   (4) hinder   (5) trigger

18. Which of the following <u>cannot</u> be inferred from the passage as the characteristic of rainforests? **[2.8점]**
(1) There exist lengthy droughts in tropical areas.
(2) Rainforests influence the earth's biodiversity.
(3) The soil might be barren due to heavy rain.
(4) The absence of sunlight promotes the growth of bushes.
(5) The leaf drop period differs among the species of deciduous trees.

[Questions 19-20]

With greater emphasis placed on education by the United States government, public schools became more popular in the late 18th century. As public education became more readily available, funding for public schools was generous and a free textbook system was implemented. In spite of these efforts, children rarely attended school beyond elementary school. Only two percent of the school-age population attended intermediate or middle school, and only one percent attended high school. Many school-age children in intermediate and secondary schools left school to work.

The development of cities, however, changed the public's perception on secondary education. It made schools more accessible to children. In the middle of the 19th century, for example, elementary schools became more widespread. Technological advancements such as the development of the telephone reduced the number of youngsters working as messengers. Accordingly, more children were able to attend schools. Children seeking jobs that required less physical labor needed more education. As these educated children reached adulthood in the latter part of the 19th century, they wanted their children to have the opportunity to receive better education. These conditions became an <u>impetus</u> for a change in the curriculum, which had remained the same since the early 19th century.

19. It can be inferred from the passage that the amount of education adults received _____. **[2.1점]**
(1) brought about the development of cities
(2) restricted changes to the curriculum in public schools
(3) increased the likelihood that their children would go to school
(4) affected the number of jobs requiring less physical labor
(5) determined the amount of donation to public schools

20. Which of the following is closest in meaning to the underlined word "impetus"? **[1.5점]**
(1) constraint   (2) stimulus   (3) eradication   (4) consequence   (5) inconvenience

[Questions 21-23]

The colonial experience left the young United States with an invaluable cultural heritage. To begin with, the earliest settlers in New England brought the English language, which became the common language for the various peoples that came to America. A common language, even more than a common culture, is a prerequisite to the building of any nation. Another precious legacy from colonial times was the

shaping of a representative form of government. The British government had allowed the colonists to elect their legislators and to establish sufficiently autonomous local governments. The colonists could therefore participate in the management of public affairs by electing legislators and officials. This prepared them for the establishment of a representative form of government after the Revolution.

A third inheritance from colonial America was a respect for basic human rights. Rights to free speech, publication and association were as entrenched in America as they had been in Britain. It is to be lamented, however, that human rights did not extend to black slaves, partly because no precedents existed in Britain. In ancient Rome, for example, slaves' rights were adequately protected by law and by convention. A fourth legacy was a healthy tolerance for different religious beliefs. As the pilgrims had fled England to seek liberty in practicing their own religion, they could readily sympathize with people following different religions from their own.

An aggressive individualism was yet another gift from colonial days. As the colonist carved a home for himself out of the wilderness, he learned the meaning of independence. That was how individualism was built into the American character.

21. It is implied in the passage that the colonists were able to run public affairs because _____. **[2.1점]**
(1) they were allowed a fair amount of independence by the British government
(2) they were forbidden to elect representatives
(3) they had a common cultural inheritance
(4) they spoke the English language
(5) they were diverse peoples

22. The passage implies that African Americans had no rights in colonial America partly because _____. **[1.5점]**
(1) there existed no right to free speech in colonial America
(2) black slaves could not speak English
(3) rights to free speech had been firmly established in England
(4) there had been no slaves in England
(5) slaves' rights were guaranteed by law in ancient Rome.

23. The passage implies that the colonists permitted religious freedom because _____. **[2.8점]**
(1) they managed to establish independent local governments
(2) they knew what it was like to be deprived of the freedom of religion
(3) they were hardly sympathetic to people with different religious beliefs
(4) they learned the significance of individualism
(5) they lamented the lack of human rights

[Questions 24-25]

The significance of human gestures has been greatly underestimated. Students of linguistics are everywhere, and the analysis of human languages is a widely accepted scientific subject, but the gesture specialist is a rare bird indeed - not so much a vanishing species, as one has hardly yet begun to evolve.

There are two reasons for this. In the first place, gestures have quite wrongly been considered a trifling, second-class form of human communication. Because verbal exchanges are man's crowning glory, all other forms of contact are viewed as somehow inferior and primitive. Yet social intercourse resorts heavily to the actions, postures, movements, and expressions of the talking bodies. Where communication of changing moods and emotional states is concerned, we would go so far as to claim that gestural information is even more important than verbal. Words are adequate for facts and for ideas. However, but for gestures, human social life would become a cold and mechanical process.

If this is so, then why has the science of gestures lagged so far behind the science of linguistics? The second factor working against such studies is a curious one and is difficult to express. It is as if, by their very nature, gestures do not like being written about. They resist verbal analysis. On reflection, this is not so surprising. Their very existence depends upon the fact that they provide a non-verbal channel of communication, and attempts to verbalize it are bound to meet with a special set of problems. These are problems that every art critic will understand. To describe in words the visual qualities that make a painting by Rembrandt a great work of art is a daunting task, and to convey the precise significance of a fleeting gesture is equally challenging.

24. It can be inferred from the passage that the science of gestures is not as prevalent as linguistics because _____. **[2.8점]**
(1) nonverbal gestures are tough to describe
(2) the study of gestures is proven to be unscientific
(3) gestural information is more essential than verbal information
(4) the exploration of gestures is a lot more difficult than that of language
(5) interpersonal communication relies solely on actions, postures, and movements

25. Which of the following would the author be least likely to agree with? **[2.8점]**
(1) Art critics comprehend the difficulty of analyzing nonverbal communication.
(2) Gestures are sometimes perceived as a lower form of communication.
(3) Nonverbal gestures have been believed to be insignificant.
(4) The study of human gestures is much less developed.
(5) Gesture scholars surpass linguists.

26. 세 자연수 a, b, c를 다음과 같이 정의하자:

- a는 집합 $X = \{1, 2, 3, 4\}$에서 $Y = \{5, 6, 7, 8\}$로 가는 일대일 대응의 개수
- b는 5명의 학생 중 3명을 선발하여 차례대로 줄을 세우는 방법의 수
- c는 48의 양의 약수의 개수

a, b, c의 크기 관계를 올바르게 나타낸 것은? **[1.5점]**

(1) $a = b > c$ (2) $a > b > c$ (3) $a = c > b$ (4) $a > b = c$ (5) $b > a > c$

27. 다항식 $f(x) = x^3 + ax^2 - 7x + b$ 가 $x + 1$로 나누어 떨어질 때, $a + b$의 값을 구하면?
[1.5점]

(1) -6 (2) -3 (3) 0 (4) 3 (5) 10

28. 2가 아닌 모든 실수 x에 대하여 $\dfrac{2x^3 + x^2 - 1}{(x^2 + 1)(x - 2)} = 2 + \dfrac{ax + b}{x^2 + 1} + \dfrac{c}{x - 2}$이 성립할 때, $a + b$ 와 c의 값을 차례로 구하면? **[2.1점]**

(1) $-\dfrac{6}{5}, \dfrac{19}{5}$ (2) $\dfrac{8}{3}, \dfrac{17}{3}$ (3) $\dfrac{8}{5}, \dfrac{19}{5}$ (4) $\dfrac{8}{5}, -\dfrac{19}{3}$ (5) $-\dfrac{8}{5}, \dfrac{13}{5}$

29. 다음 중에서 옳은 것만을 있는 대로 고른 것은? **[2.8점]**

- ㉠ $1 + i$ 를 근으로 가지고 x^2의 계수가 1이며 모든 계수가 실수인 이차방정식은 단 한개 존재한다.
- ㉡ ω가 삼차방정식 $x^3 - 1 = 0$ 의 한 허근이면 ω^2 도 $x^3 - 1 = 0$의 근이다.
- ㉢ 복소수 $z = a + bi$ $(b \neq 0)$ 가 방정식 $x^4 + x^2 - 2 = 0$의 근이면, $\dfrac{1}{z}$도 $x^4 + x^2 - 2 = 0$의 근이다.
- ㉣ 모든 계수가 실수인 삼차방정식은 적어도 한 개의 실근을 갖는다.

(1) ㉡ ㉢   (2) ㉠ ㉡   (3) ㉠ ㉢ ㉣   (4) ㉠ ㉡ ㉣   (5) ㉠ ㉣

30. 두 양수 a, b에 대하여, 세 조건 p, q, r 이 다음과 같이 주어졌다고 하자.

$$p : |5 - x^2| > 1, \qquad q : x > a, \qquad r : x^2 + bx < 0$$

명제 $q \to p$ 와 명제 $r \to p$ 가 모두 참이 되도록 하는 a의 최솟값과 b의 최댓값을 차례대로 구하면? **[2.1점]**

(1) $\sqrt{3}, 2$ (2) $\sqrt{6}, 2$ (3) $2\sqrt{6}, 1$ (4) $2, 2\sqrt{6}$ (5) $\sqrt{3}, \sqrt{6}$

31. 다음 함수 중에서 그 그래프를 평행이동하여 함수 $y = \dfrac{2}{x}$의 그래프와 일치하는 것만을 있는 대로 고른 것은? **[1.5점]**

㉠ $y = \dfrac{2x-1}{x}$	㉡ $y = \dfrac{-2}{x}$	㉢ $y = \dfrac{x+1}{x-1}$	㉣ $y = \dfrac{x+1}{2x+1}$

(1) ㉠ ㉣   (2) ㉠ ㉡   (3) ㉢   (4) ㉠ ㉢   (5) ㉡ ㉢ ㉣

32. 다음 중에서 옳은 것만을 있는 대로 고른 것은? **[2.1점]**

㉠ 실수 a, b에 대해 $|a+b| \le |a| + |b|$가 성립한다.
㉡ 실수 a, b에 대해 $|a-b| = ||a| - |b||$가 성립한다.
㉢ 양의 실수 a, b에 대해 $\sqrt{ab} \le \dfrac{a+b}{2}$가 성립한다

(1) ㉠   (2) ㉠ ㉡   (3) ㉠ ㉡ ㉢   (4) ㉡ ㉢   (5) ㉠ ㉢

33. 두 함수 $y = \left(\dfrac{1}{2}\right)^x$, $y = 8\left(\dfrac{1}{2}\right)^x$의 그래프와 두 직선 $y = 1, y = 4$ 로 둘러싸인 부분의 넓이를 구하면? **[2.1점]**

(1) 9   (2) 8   (3) 4   (4) 3   (5) 2

※ <u>34번~36번</u>은 세트형 문제입니다. 아래 제시문을 보고 물음에 답하십시오.

두 점 A와 B가, 한 점 $(5,0)$에서 출발하여 다음과 같이 좌표평면 위를 움직인다:

- A는 x축 위를 움직이며 시각 $t \ (t \geq 0)$에서의 속도는 $v(t) = \dfrac{1}{4}(1-t)(4-t)$이다.

- B는 원점을 중심으로 하고 반지름이 5인 원 $x^2 + y^2 = 25$ 위를 단위 시간당 $\dfrac{5\sqrt{2}\pi}{16}$만큼씩 시계 반대 방향으로 움직인다.

34. $t = 0$에서 $t = 3$까지 점 A가 움직인 거리는? **[1.5점]**

(1) $\dfrac{21}{2}$ (2) $\dfrac{31}{24}$ (3) $\dfrac{5}{4}$ (4) 2 (5) $\dfrac{7}{3}$

35. $t = 2\sqrt{2}$일 때 A와 B의 좌표를 차례로 구하면? **[2.1점]**

(1) $(\dfrac{23\sqrt{2}}{3}, 0), (\dfrac{5}{2}, \dfrac{5\sqrt{3}}{2})$ (2) $(\dfrac{13}{3}, 0), (0, 5)$ (3) $(5, 0), (\dfrac{-5\sqrt{2}}{2}, \dfrac{5\sqrt{2}}{2})$

(4) $(\dfrac{10\sqrt{2}}{3}, 0), (\dfrac{5\sqrt{2}}{2}, \dfrac{5\sqrt{2}}{2})$ (5) $(\dfrac{10\sqrt{2}}{3}, 0), (\dfrac{-5}{2}, \dfrac{15}{2\sqrt{3}})$

36. $t = 2\sqrt{2}$일 때의 점 A와 점 B, 그리고 원점 O에 대하여, $\angle OAB$의 크기를 θ라고 할 때, $\cos\theta$ 의 값을 계산하면? **[2.8점]**

(1) $\dfrac{1}{\sqrt{10}}$ (2) $\dfrac{-2}{\sqrt{10}}$ (3) $\dfrac{2}{\sqrt{10}}$ (4) $\dfrac{2}{\sqrt{5}}$ (5) $\dfrac{-1}{\sqrt{5}}$

37. 다음 중에서 함수 $y = \log(-x+1)+2$에 대한 설명으로 옳은 것만을 있는 대로 고른 것은? **[2.1점]**

㉠ 정의역은 $\{x \mid x < 1\}$이다.
㉡ 치역은 $\{y \mid y < 2\}$이다.
㉢ x의 값이 증가하면 y의 값은 감소한다.
㉣ 그래프는 $y = \log(-x)$의 그래프를 x축의 방향으로 1만큼, y축의 방향으로 2만큼 평행이동한 것이다.

(1) ㉠　　　(2) ㉠ ㉢　　　(3) ㉠ ㉢ ㉣　　　(4) ㉠ ㉣　　　(5) ㉡ ㉣

38. $-\dfrac{\pi}{2} < \theta < \dfrac{\pi}{2}$ 에서 $\sin\theta = -\dfrac{1}{7}$ 일 때, $\tan\theta$의 값은? **[1.5점]**

(1) $\dfrac{1}{4\sqrt{3}}$　　　(2) $\dfrac{1}{2\sqrt{3}}$　　　(3) 1　　　(4) $\dfrac{-1}{4\sqrt{3}}$　　　(5) $\dfrac{-1}{2\sqrt{3}}$

39. $0 \le \theta < 2\pi$ 일 때, x에 대한 이차방정식 $6x^2 + (4\sin\theta)x - \cos\theta = 0$이 실근을 갖지 않도록 하는 모든 θ의 값의 범위는 $\alpha < \theta < \beta$ 이다. $\alpha + \beta$의 값은? **[2.1점]**

(1) $\dfrac{5\pi}{6}$　　　(2) $\dfrac{7\pi}{6}$　　　(3) $\dfrac{3\pi}{2}$　　　(4) π　　　(5) 2π

40. 다음 삼각함수에 관한 설명 중 옳은 것만을 있는 대로 고른 것은? **[2.8점]**

㉠ 함수 $f(x) = \sin x + \cos 2x$ 는 주기가 π인 주기함수이다.
㉡ 함수 $g(x) = \tan x$ $\left(-\dfrac{\pi}{2} < x < \dfrac{\pi}{2}\right)$ 는 역함수가 존재한다.
㉢ 함수 $h(x) = \cos x$ $\left(-\dfrac{\pi}{2} < x < \dfrac{\pi}{2}\right)$ 는 역함수가 존재한다.
㉣ 모든 양의 실수 x에 대하여 $\displaystyle\int_0^x \sin t \, dt \ge 0$이 성립한다.

(1) ㉠　　　(2) ㉡　　　(3) ㉠ ㉡ ㉣　　　(4) ㉡ ㉣　　　(5) ㉠ ㉢

41. 자연수 n에 대하여 x에 대한 이차방정식 $x^2 - nx + 3(n-3) = 0$이 서로 다른 두 실근 $\alpha, \beta \ (\alpha < \beta)$를 갖고 $-3, \ \alpha, \ \beta$ 가 이 순서대로 등차수열을 이룰 때, 가능한 모든 n의 합을 구하면? **[2.1점]**

(1) 3   (2) 6   (3) 12   (4) 15   (5) 21

42. 수열 $\{a_n\}$은 $a_1 = 1$이고 모든 자연수 n에 대하여 $\begin{cases} a_{2n} = 2a_n - 1 \\ a_{2n+1} = -a_n + 2 \end{cases}$ 을 만족시킨다.

$\displaystyle\sum_{n=2}^{15} a_n$의 값은? **[1.5점]**

(1) 14   (2) 11   (3) 10   (4) 7   (5) 6

43. 함수 $f(x) = x^3 + ax^2 + bx + 2$ 가 $\displaystyle\lim_{x \to 0} \frac{f(x+1) - 5}{x} = 0$을 만족시킬 때, 상수 a, b의 값을 차례로 적은 것은? **[1.5점]**

(1) $-5, 3$ (2) $-5, 7$ (3) $5, -3$ (4) $3, -3$ (5) $3, -7$

44. 다음 중 옳은 것만을 있는 대로 고른 것은? **[2.1점]**

> ㉠ 모든 양의 실수 x에 대하여 $f(x) < g(x)$ 이고 극한 $\displaystyle\lim_{x \to \infty} f(x)$와 $\displaystyle\lim_{x \to \infty} g(x)$가 존재하면 $\displaystyle\lim_{x \to \infty} f(x) < \lim_{x \to \infty} g(x)$이 성립한다.
>
> ㉡ 함수 $g(x) = \begin{cases} \dfrac{x}{|x|} & (x \neq 0) \\ 1 & (x = 0) \end{cases}$ 는 모든 실수 x에서 연속이다.
>
> ㉢ 닫힌구간 $[0, 5]$에서 연속인 함수 $h(x)$가 $h(0) = 0, \ h(5) = 5$를 만족하면, $h(a) = 3$을 만족하는 a가 열린구간 $(0, 5)$에 존재한다.
>
> ㉣ 닫힌구간 $[0, 5]$에서 연속이고 열린구간 $(0, 5)$에서 미분가능한 함수 $h(x)$가 $h(0) = 0, \ h(5) = 5$를 만족하면 $h'(a) = 1$을 만족하는 a가 열린구간 $(0, 5)$에 존재한다.

(1) ㉠   (2) ㉡ ㉢ ㉣   (3) ㉠ ㉡ ㉣   (4) ㉡ ㉢   (5) ㉢ ㉣

45. 함수 $f(x) = \begin{cases} x^2 - ax & (x \geq 2) \\ bx^2 + 1 & (x < 2) \end{cases}$ 가 $x = 2$에서 미분가능할 때, 상수 a, b의 합은? **[1.5점]**

(1) $\dfrac{5}{4}$　　　　(2) 2　　　　(3) $\dfrac{1}{4}$　　　　(4) 0　　　　(5) $-\dfrac{1}{6}$

46. $f(x) = x^{2022} + x^{2021} + x^{2020} + \cdots + x^3 + x^2 + x + 1$일 때, 다음 극한값은? **[2.1점]**
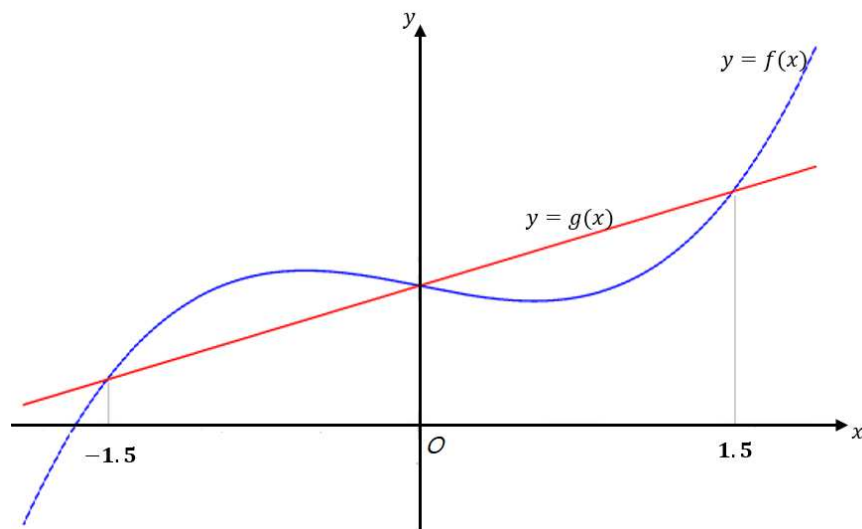
$$\lim_{x \to -1} \frac{f(x) - f(-1)}{x^2 - 1}$$

(1) 0　　　　(2) $\dfrac{1011}{2}$　　　(3) $-\dfrac{1011}{2}$　　　　(4) 1011　　　　(5) -1011

※ <u>47번~50번은 세트형 문제입니다. 아래 제시문을 보고 물음에 답하십시오.</u>

x^3의 계수가 0.4인 삼차 함수 $f(x)$와 일차 함수 $g(x)$의 그래프가 다음 그림과 같이

주어져 있을 때, $F(x) = \begin{cases} \displaystyle\int_0^x \{f(t) - g(t)\}\, dt & (x \geq 0) \\ \displaystyle\int_x^0 \{f(t) - g(t)\}\, dt & (x < 0) \end{cases}$ 라고 하자.

47. 정적분 $\int_{-1}^{1} \{f(x) - g(x)\} \, dx$ 를 계산한 값은? **[1.5점]**

(1) -1　　　　(2) -0.5　　　　(3) 0　　　　(4) 0.5　　　　(5) 1

48. $F'(1)$을 계산한 값은? **[1.5점]**

(1) -0.5　　　　(2) -0.4　　　　(3) -0.1　　　　(4) 0　　　　(5) 0.4

49. 함수 $F(x)$에 대한 다음 설명 중 옳은 것만을 있는 대로 고른 것은? **[2.8점]**

> ㉠ 함수 $F(x)$는 열린 구간 $(0, \infty)$에서 감소한다.
> ㉡ $F(x) = 0$이 되는 x가 열린 구간 $(0, \infty)$에 존재한다.
> ㉢ 함수 $F(x)$는 모든 실수 x에서 미분 가능한 함수이다.

(1) ㉠　　　　(2) ㉡ ㉢　　　　(3) ㉠ ㉡　　　　(4) ㉡　　　　(5) ㉠ ㉡ ㉢

50. 함수 $F(x)$에 관한 설명으로 옳은 것은? **[2.8점]**

(1) $x = -\dfrac{3}{2}$ 일 때 최댓값을 가지고 $x = \dfrac{3}{2}$ 일 때 최솟값을 갖는다.

(2) $x = -\dfrac{3}{2}$ 일 때 최솟값을 가지고 $x = \dfrac{3}{2}$ 일 때 최댓값을 갖는다.

(3) $x = 0$일 때 최댓값을 가지고 $x = \pm\dfrac{3}{2}$일 때 최솟값을 갖는다.

(4) $x = 0$일 때 최솟값을 가지고 $x = \pm\dfrac{3}{2}$일 때 최댓값을 갖는다.

(5) 최댓값과 최솟값은 존재하지 않고, $x = -\dfrac{3}{2}$일 때 극댓값을, $x = \dfrac{3}{2}$ 일 때 극솟값을 갖는다.