
2024학년도
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]

The recurrent name changes that the nation has undergone ____ [1] ____ the political turbulence that has rocked the nation in recent history.

1. Which best fits into the blank [1]? [1.5점]

- (1) contend with (2) aspire to (3) testify to (4) object to (5) contrast with

[Question 2]

Leaving his niece's wedding reception, newly installed King George V keeps his dog, Pip, on a tight leash. As the South Pacific's last ruling monarch, the king is struggling to keep control amid demands for democratic reform by activists, some of whom have been put on trial for sedition. To quell the unrest, the king has ____ [2] ____ certain political reforms, but only those he deems "appropriate for Tonga."

2. Which best fits into the blank [2]? [1.5점]

- (1) relinquished (2) endorsed (3) withheld (4) discarded (5) eluded

[Question 3]

African American Lewis Howard Latimer invented the carbon filament for light bulbs, which are present in people's homes, offices, and streets today. Lewis invented the process of producing carbons. Without this process, light could not be shed using electricity. His economical method of producing carbon filaments ____ [3a] ____ the emerging electric industry by making electric lamps commercially ____ [3b] ____.

3. Which best fits into the blank [3a] and [3b]? [1.5점]

- | | [3a] | | [3b] |
|-----|--------------|-----|-------------|
| (1) | abated | ... | feasible |
| (2) | stirred | ... | implausible |
| (3) | transformed | ... | viable |
| (4) | rectified | ... | doubtful |
| (5) | deteriorated | ... | affordable |

[Question 4]

A barge of soybeans is readied for shipment along the Madeira River. Although cattle ranching still drives most Amazonian deforestation, the ____ [4] ____ of large-scale soy farming over the past decade is also wiping out forests, particularly in Mato Grosso. An average of 8,500 square miles of Amazon rain forest was cut down annually between 2000 and 2005.

4. Which best fits into the blank [4]? [1.5점]

- (1) inhibition (2) regulation (3) demolition (4) annihilation (5) proliferation

[Question 5]

The strong affection of wild sheep for mountains is ____ [5a] ____: mountain slopes represent ____ [5b] ____ because they effectively confine the capability of less agile predators to pursue the sheep.

5. Which best fits into the blank [5a] and [5b]? [2.1점]

- | | [5a] | | [5b] |
|-----|--------------|-----|----------------|
| (1) | instinctive | ... | accomplishment |
| (2) | congenital | ... | security |
| (3) | effectual | ... | peril |
| (4) | coincidental | ... | jeopardy |
| (5) | accidental | ... | nourishment |

[Question 6]

Most of the subsidiary CEOs, accustomed to the luxury of being chauffeured to corporate meetings in company limousines, were predictably ____ [6a] ____ when they were notified that this service had been ____ [6b] ____.

6. Which best fits into the blank [6a] and [6b]? [2.1점]

- | | [6a] | | [6b] |
|-----|-------------|-----|-----------|
| (1) | irritated | ... | sustained |
| (2) | gratified | ... | annulled |
| (3) | dejected | ... | extended |
| (4) | disgruntled | ... | suspended |
| (5) | emaciated | ... | upheld |

[Question 7]

No one would have predicted such a swift outcome back in March, when this all began with the obvious but startling admission by one of the smallest tobacco companies, Liggett Group, ____ [7a] ____ cigarettes are addictive and have been pointedly marketed at kids for years. The confession signaled the first real break from the industry's see-no-evil posture. Reportedly, the event prompted North Carolina Governor James Hunt to call his friend Bill Clinton. The White House then got in touch with Mississippi's Moore to ask if talks with the industry might prove ____ [7b] ____.

7. Which best fits into the blank [7a] and [7b]? [1.5점]

- | | [7a] | | [7b] |
|-----|-------|-----|--------------|
| (1) | what | ... | production |
| (2) | which | ... | production |
| (3) | which | ... | productive |
| (4) | that | ... | productively |
| (5) | that | ... | productive |

[Question 8]

A serious reminder of the volcano's lethal power, the plaster cast of a victim of the A.D. 79 eruption lies on display at Pompeii. Many died pressing pillows to their faces in a vain attempt to keep from inhaling ash. Mt. Vesuvius typically ____ [8a] ____ a giant column of ash and stones that is dispersed by wind. The ongoing evacuation plan is based on the 1631 blast, which barely reached the Naples area, but scientists have learned recently that a larger eruption in 1780 B.C. ravaged most of where the city now sits. Such ____ [8b] ____ eruptions occur about every 2,000 years, so the next is coming due.

8. Which best fits into the blank [8a] and [8b]? [2.1점]

- | | [8a] | | [8b] |
|-----|------------|-----|--------------|
| (1) | emits | ... | catastrophic |
| (2) | spews | ... | trivial |
| (3) | expels | ... | trifling |
| (4) | proscribes | ... | disastrous |
| (5) | suppresses | ... | cataclysmic |

[Question 9]

In his presentation, the Managing Director informed the Board that the profits earned from the business would rise more than 50% and that they were supposed to recommend a bonus for the supervisor who he thought should be rewarded at last week's meeting.

9. Which of the underlined words is grammatically incorrect? [2.1점]

- (1) informed (2) earned (3) were supposed to (4) who (5) should be

[Question 10]

I am an outstanding driver. Or I thought so. Ten minutes of steering an 18-wheeler loaded with 40,000 pounds of oranges down an interstate highway in Arizona forced me to reevaluate that belief. Maneuvers I take for granting in a car became absolutely arduous. How to describe the feeling of piloting one of these thundering weights? Imagine trying to keep that mass moving in a straight line. My respect for truckers grew greatly in those ten minutes.

10. Which of the underlined words is grammatically incorrect? [2.1점]

- (1) loaded (2) to reevaluate (3) granting (4) trying (5) grew

[Question 11]

In the nineteenth century many people accepted as scientific grounded not only face-reading, or physiognomy, but also head-reading, or phrenology. The bumps on a person's cranium, they thought, revealed his or her personality; so did the shape of the mouth or the tilt of the nose. Contemporary thinking has it that what goes on in the brain does not depend on the face, and yet, just as astrology continues to flourish in a scientific world, so too does "phys/phren," as the combination has come to be called.

11. Which of the underlined words is grammatically incorrect? [1.5점]

- (1) scientific (2) did (3) Contemporary (4) what (5) to flourish

[Question 12]

Recent technical and clinical advances with cell-based therapies (CBTs) hold great promise in the treatment of patients with rare diseases and those with unfulfilled medical need. Currently the majority of CBTs are developed and manufactured in specialized academic facilities. Due to small-scale, unique characteristics and specific supply chain, CBT manufacturing is considered ____ [12a] ____ compared to more conventional medicinal products. As a result, biomedical researchers and clinicians are increasingly faced with cost considerations in CBT development. The objective of this research is to develop a costing framework and methodology for academic and other small-scale facilities that ____ [12b] ____ cell-based therapies.

12. Which best fits into the blank [12a] and [12b]? [1.5점]

- | | [12a] | | [12b] |
|-----|-------------|-----|---------------|
| (1) | costly | ... | manufacturing |
| (2) | costly | ... | manufacture |
| (3) | expense | ... | manufacturing |
| (4) | expensively | ... | manufacturing |
| (5) | expensively | ... | manufacture |

[Questions 13-14]

Einstein frequently conveyed an opinion against nationalism, the elevation of one nation above all others. He opposed war and violence and supported Zionism, the movement to establish a Jewish homeland in Palestine. When the Nazis came to power in 1933, they (13) reproached his ideas. He then moved to the United States. In 1939 Einstein learned that two German chemists had split the uranium atom. Einstein wrote to President Franklin D. Roosevelt warning him that this science-based knowledge could lead to Germany develop an atomic bomb. He suggested the United States begin its own atomic bomb research.

13. Which of the following is closest in meaning to the underlined word "reproached"? [1.5점]

- (1) ratified (2) scrutinized (3) complimented (4) acclaimed (5) denounced

14. Which of the underlined words is grammatically incorrect? [1.5점]

- (1) to establish (2) moved (3) had split (4) develop (5) begin

[Questions 15-17]

Spending on safety nets is low (except in middle-income countries in southern Africa) but highly variable over time and has increased since the global crisis. However, in many countries, general subsidies remain excessively and do not proportionately benefit the poor. The concentration of safety net spending on [16a] emergency and food-based programs means that neither donors nor governments have focused on funding sustainable safety nets designed to reduce long-term chronic poverty. A better allocation of social protection spending would make these programs more effective and more sustainable over the long term and make possible harmonization of disparate programs into a [17] national safety net. Political economy considerations seem important when [16b] tightly targeted programs with other investments that can benefit a wider population and contribute to improved social outcomes.

15. Which of the underlined words is grammatically incorrect? [2.1점]

- (1) has increased (2) excessively (3) designed (4) possible (5) important

16. Which best fits into the blank [16a] and [16b]? [2.8점]

	[16a]		[16b]
(1)	scattered	...	balancing
(2)	scattered	...	balanced
(3)	scattering	...	balancing
(4)	scatter	...	balanced
(5)	scattering	...	balance

17. Which best fits into the blank [17]? [1.5점]

- (1) vague (2) erratic (3) coherent (4) tangled (5) redundant

[Question 18]

The internet is believed to have rapidly become another means of disseminating information traditionally made available through radio and television stations. Indeed, it is now possible for journalists and the public to access new releases of audio- and videotapes, satellite media tours, and on-line news conferences by means of their computers. The number of news sites on the internet increases each day. As one media company executive notes, "With many of these web sites generating new content every hour and exponentially larger audiences, on-line news sites represent a vigorous and vital outlet for news."

18. Which of the following best captures the attitude of the "company executive" in line 6 toward the internet? [2.1점]

- (1) Zeal (2) Apathy (3) Disdain (4) Suspicion (5) Resentment

[Question 19]

No one denies that farm families are able to attain efficiency only through a brutal work schedule that few people could tolerate. "The farm family does physically demanding work and highly stressful work at least 14 hours a day (often at least 18 hours a day during harvest season), 7 days a week, 365 days a year, without a scheduled vacation or weekends off," wrote Minnesota politician and farm alumnus Darrell McKingney. "The farmer must go through all of this without any of the benefits that most United States labor unions demand." A dairy farmer, for instance, just cannot take off for a two-week vacation. "Farmers lose perspective on the other things in life," one psychologist has written. "The farm literally consumes them."

19. The passage is primarily concerned with the _____. [2.1점]

- (1) ethics and morals of food production
- (2) need for farmers to establish a labor union
- (3) viewpoints of most Americans about farm life
- (4) very severe working conditions in a lot of farms
- (5) consumption of most of the food produced by the farm

[Question 20]

It is conceived that the Second World War was a watershed event for all Americans. It put an end to the Great Depression and marked the beginning of considerable socioeconomic and political alterations for women and racial minorities. Chinese American women played an essential role in these long-term transitions.

Galvanized by motives ranging from Chinese nationalism to American patriotism and feminism, Chinese American women initiated an outpouring of highly organized activities in such areas as fund-raising, propaganda, civil defense, and Red Cross work. While some women in San Francisco's Chinatown enlisted in the armed services, many others went to work in businesses outside their neighborhood and in defense industries for the first time.

20. The primary purpose of the passage is to _____. [2.1점]

- (1) assert the influence of feminism on Chinese American women
- (2) convey the impact of World War II on Chinese American women
- (3) underline the contributions of San Francisco's Chinatown to war industries
- (4) depict the varied occupations held by women during the Second World War
- (5) make clear how the Second World War brought the Great Depression to an end

[Question 21]

If we speak properly, a movement is a continuous, cooperative effort to accomplish fundamental social reform. It is a collaborative rather than an individualistic enterprise. No matter how many factions are involved, there is always a communal objective. The African American freedom struggle of the 1960's was such an effort. Its objective was to alter the manner in which African Americans in the United States were perceived and treated. And African American writers and artists, as a vital sector of the movement, strove to alter the manner in which African Americans were depicted or portrayed in literature and the arts.

21. The passage indicates that African American writers and artists were most significant to the freedom struggle in that they _____. [2.1점]

- (1) stipulated a course of action to help ensure social justice
- (2) were a well integrated group that opposed excessive individualism
- (3) greatly contributed to freedom of artistic expression for African Americans
- (4) developed powerful protest art that advocated the African American struggle
- (5) endeavored to modify the way African American people were characterized in the arts

[Question 22]

Honoré de Balzac is a French novelist and playwright. Owing to his keen observation of detail and unfiltered description of society, Balzac is regarded as one of the founders of realism in European literature. It was an irony duplicated in other matters that he could be financially wise in his fiction while losing all his money in life. For instance, the very women who had been drawn to him by the penetrating intuition of the female heart that he showed in his novels were appalled to ascertain how callous and awkward the real man could be.

It seems that the real source of all creation for Balzac was not empathy but imagination. At age ten Balzac was sent to the Oratorian grammar school in Vendôme, where he studied for seven years. He had difficulty adapting to the routine style of learning at the school. As a result, he was frequently sent to the "alcove", a punishment cell reserved for disobedient students. Balzac's fiction originally sprang from an intuition he first detected as a pathetic little school boy locked in a dark closet of his boarding school: life is a prison, and only imagination can open its doors.

22. The author mentions Balzac's experience as a school boy in order to _____. [2.8점]

- (1) denote a potential source of Balzac's powerful ingenuity
- (2) justify the boarding school for Balzac's tedious performance
- (3) bring up the impression that Balzac was a disorderly student
- (4) illustrate a congenial environment of the boarding school during Balzac's youth
- (5) account for why Balzac was not able to conduct his financial affairs appropriately

[Question 23]

The timber wolf, which is also known as the gray wolf, is a mammal of the carnivore family. Genetic studies demonstrate that the timber wolf shares a common ancestry with the domestic dog and might be its ancestor. Many other timber wolf subspecies have been identified. However, the actual number of subspecies is still open to discussion. Though once abundant over much of North America and areas of Europe and Asia, the timber wolf populates a very small portion of its former range because of the widespread devastation of its habitat. Timber wolves are highly adaptable and have thrived in forests, deserts, mountains, tundra and grasslands. They function as social predators and hunt in packs organized in accordance with strict social hierarchies. It was originally believed that this comparatively high level of social organization was associated with hunting success, and while this still may be valid to a certain extent, emerging theories claim that the pack has less to do with hunting and more to do with reproductive success.

23. It is understood from the passage that _____. [2.8점]

- (1) the timber wolf could have descended from the domestic dog
- (2) the timber wolf prefers to hunt individually rather than collectively
- (3) timber wolves have been able to dwell in a wide variety of habitats
- (4) many of timber wolf subspecies are known to have already become extinct
- (5) there is consensus on how many timber wolf subspecies reproduced successfully

[Question 24]

It is known that slavery is a system under which certain persons are totally deprived of personal freedom and impelled to perform labor or services. Although outlawed in approximately all countries, slavery is still practiced in some parts of the world. The evidence for slavery predates written records. It can be found in almost all cultures and continents. Historically, most slaves were captured in wars but some persons were sold into slavery by their parents, or by themselves, as a means of coping with extreme conditions. Ancient warfare frequently culminated in slavery for prisoners and their families. Captives were often considered the property of those who captured them and were looked upon as a prize of war. The possibility always existed of reversals of fortune at the height of the Roman Empire, when anyone could find himself enslaved.

24. According to the passage, slavery _____. [2.8점]

- (1) has recently been abolished by all nations
- (2) commenced when the Roman Empire was founded
- (3) is a system under which the enslaved are allowed some amount of freedom
- (4) meant for some people overcoming the harsh conditions they had to endure
- (5) was banned by international agreements between countries involved in ancient times

[Question 25]

Conventionally, a lot of linguists accentuated the significance of mastering grammar structures first while teaching English. In recent years, the majority of educators have become more aware of the fallacy of this methodology and other methodologies promoting vocabulary development have gained prevalence. It has been uncovered that the learners can actually say very little despite being able to manipulate complex grammatical structures in exercise drills. It is apparent that to learn English, one needs to learn many words. Native speakers have a vocabulary of about 20,000 words but foreign learners of English need far fewer. They need only about 5,000 words to be quite competent in speaking and listening. The reason for this seemingly small number is the nature of words and the frequency with which they appear in a language. It appears manifest that frequent words should be among the first words to learn because they will be encountered most of the time and will be needed in speech or writing.

25. According to the passage, it is true that while learning English, a non-native speaker _____ . [2.8점]

- (1) must promptly master grammar structures
- (2) should first attempt to enhance his comprehension of written texts
- (3) needs to be taught at least 20,000 words to communicate without trouble
- (4) cannot attain proficiency in communicative skills in English just through mastering grammar structures
- (5) must concentrate on practicing as many grammar structures as possible according to current language teaching approaches

26. 다항식 $x^3 + ax^2 + bx$ 가 $x-2, x+1$ 로 각각 나누어떨어질 때, 상수 a, b 에 대하여 $a+b$ 의 값은? [1.5점]

- ① -5 ② -4 ③ -3 ④ -2 ⑤ -1

27. 방정식 $x^3 = -1$ 의 한 허근을 ω 라 할 때, $2\omega^5 - \omega^4 + \omega^3 - \omega^2 + \omega - 2 = a\omega + b$ 를 만족시키는 실수 a, b 에 대하여 a 와 b 의 값을 차례로 구하면? [1.5점]

- ① -1, 0 ② 1, 0 ③ 0, 1 ④ 0, -1 ⑤ -1, -1

28. 이차부등식 $f(x) \geq 0$ 의 해가 $-5 \leq x \leq 5$ 일 때, 다음 중 부등식 $f(2024-x) < 0$ 의 해가 될 수 있는 것은? [1.5점]

- ① 2018 ② 2020 ③ 2023 ④ 2025 ⑤ 2028

29. 실수 k 에 대하여 점 $(1, -3)$ 과 직선 $x - 3y - 4 + k(3x + y) = 0$ 사이의 거리를 $f(k)$ 라 할 때, $f(k)$ 의 최댓값은? [2.8점]

- ① $\frac{1}{5}$ ② $\frac{\sqrt{5}}{5}$ ③ $\frac{\sqrt{10}}{5}$ ④ $\frac{3\sqrt{10}}{5}$ ⑤ $\frac{6\sqrt{10}}{5}$

30. 두 조건 $p: |x-a| > 1, q: |x+2| \leq 6$ 에 대하여 명제 $\sim p \rightarrow q$ 가 참이 되도록 하는 a 의 최솟값과 최댓값을 차례대로 구하면? [2.1점]

- ① -8, 4 ② -7, 3 ③ -4, 4 ④ -3, 7 ⑤ -4, 8

31. 다음 도형 중 평행이동하여 원 $x^2 + y^2 - 4x - 6y + 12 = 0$ 과 포개어지는 것만을 있는 대로 고른 것은? [1.5점]

- ㉠ $x^2 + y^2 = 1$
 ㉡ $(x-2)^2 + (y-3)^2 = 12$
 ㉢ $x^2 + y^2 - 2x - 2y + 1 = 0$

- ① ㉠ ② ㉠, ㉡ ③ ㉠, ㉢ ④ ㉡, ㉢ ⑤ ㉠, ㉡, ㉢

32. 두 함수 $y = \sqrt{x+4}$, $y = \sqrt{x-4}$ 의 그래프와 x 축 및 직선 $y=2$ 로 둘러싸인 부분의 넓이는? [2.1점]

- ① 4 ② 8 ③ 10 ④ 16 ⑤ 18

33. 다음 식의 분모를 0으로 만들지 않는 모든 실수 x 에 대하여

$$\frac{2x^2}{x^3 - x^2 - x + 1} = \frac{a}{1+x} + \frac{b}{1-x} + \frac{c}{(1-x)^2} \text{가 성립할 때, } abc \text{의 값은? [2.1점]}$$

- ① -2 ② $-\frac{3}{4}$ ③ 0 ④ $\frac{1}{2}$ ⑤ $\frac{3}{2}$

34. 남학생 6명과 여학생 5명 중에서 반장 1명, 부반장 1명을 뽑을 때, 반장, 부반장 중에서 적어도 한 명은 남학생이 뽑히는 경우의 수는? [1.5점]

- ① 20 ② 30 ③ 60 ④ 90 ⑤ 110

35. 부등식 $2^{2x+1} - 15 \cdot 2^x + 7 \leq 0$ 을 만족시키는 정수 x 의 개수는? [1.5점]

- ① 2 ② 3 ③ 4 ④ 5 ⑤ 6

36. 1이 아닌 네 양수 a, b, c, d 에 대하여 $\frac{\log_a b}{\log_c d} = 1$ 일 때, 옳은 것을 있는 대로 고른 것은?

[2.8점]

- ㉠ $d = c^2$ 이면 $a = \sqrt{b}$ 이다.
 ㉡ $ac = 1$ 이면 $bd = 1$ 이다.
 ㉢ $b = d$ 이면 $a = c$ 이다.

- ① ㉠ ② ㉠, ㉡ ③ ㉠, ㉢ ④ ㉡, ㉢ ⑤ ㉠, ㉡, ㉢

37. $0 \leq x \leq 2\pi$ 일 때, 다음 중 부등식 $\cos x \geq \sin x$ 를 만족시키는 x 의 값의 범위에 속하지 않는 것은? [1.5점]

- ① 0 ② $\frac{\pi}{5}$ ③ $\frac{\pi}{3}$ ④ $\frac{3}{2}\pi$ ⑤ $\frac{7}{4}\pi$

38. 다음 중 함수 $f(x) = 3\cos 2x - 1$ 에 대한 설명으로 옳은 것을 있는 대로 고른 것은?

[2.1점]

- ㉠ 함수 $g(x) = \tan x$ 와 주기가 같다.
 ㉡ 모든 실수 x 에 대하여 $f(x) = f(-x)$ 이다.
 ㉢ $\frac{\pi}{2} \leq x \leq \frac{3}{4}\pi$ 에서 x 의 값이 증가하면 y 의 값도 증가한다.
 ㉣ 최댓값은 4이고 최솟값은 -4이다.

- ① ㉠, ㉡ ② ㉠, ㉡, ㉣ ③ ㉡, ㉣, ㉤ ④ ㉠, ㉣, ㉤ ⑤ ㉠, ㉡, ㉣, ㉤

39. $-\frac{\pi}{2} \leq \theta \leq \frac{\pi}{2}$ 일 때, 함수 $y = 2\sin^2(\theta + \frac{\pi}{2}) + \sin^2\theta + 4\cos(\theta + \pi)$ 의 최댓값을 α , 최솟값을 β 라 할 때, $\alpha\beta$ 의 값은? [2.8점]

- ① -4 ② -2 ③ 0 ④ 2 ⑤ 4

40. 두 등차수열이 $\{a_n\}: 24, a, 8, b, -8, \dots$ 와 $\{b_n\}: \log_3 2, c, \log_3 18, d, \log_3 162, \dots$ 일 때, $a - b + c - d$ 의 값은? [2.1점]

- ① 10 ② 11 ③ 12 ④ 13 ⑤ 14

41. 수열 $\{a_n\}$ 에 대하여 $\sum_{k=1}^n a_k = \log \frac{(n+1)(n+2)}{2}$ 이다. $\sum_{k=1}^{18} a_{2k+1} = p$ 라고 할 때, 10^p 의 값은? [2.1점]

- ① 5 ② 7 ③ 9 ④ 13 ⑤ 15

42. 다항함수 $f(x)$ 가 $\lim_{x \rightarrow 0} \frac{f(x)}{x} = 9$ 를 만족시킬 때, $\lim_{x \rightarrow 3} \frac{f(x-3)}{x^3 - 27}$ 의 값은? [1.5점]

- ① $\frac{1}{27}$ ② $\frac{1}{9}$ ③ $\frac{1}{3}$ ④ $\frac{1}{2}$ ⑤ 1

43. 곡선 $y = x^3 - 6x^2 + 8x$ 위의 두 점 $(2,0)$, $(4,0)$ 에서 접선을 그을 때, 두 접선의 교점은 (a,b) 이다. 이때, $a+b$ 의 값은? [1.5점]

- ① $-\frac{16}{3}$ ② -2 ③ 0 ④ $\frac{10}{3}$ ⑤ 4

44. 함수의 극한에 대하여 다음 중 옳은 것을 있는 대로 고른 것은? [2.8점]

- ㉠ $\lim_{x \rightarrow a} g(x)$ 와 $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$ 의 값이 각각 존재하면 $\lim_{x \rightarrow a} f(x)$ 의 값도 존재한다. (단, $g(x) \neq 0$)
- ㉡ $\lim_{x \rightarrow a} f(x)$ 와 $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$ 의 값이 각각 존재하면 $\lim_{x \rightarrow a} g(x)$ 의 값도 존재한다. (단, $g(x) \neq 0$)
- ㉢ $\lim_{x \rightarrow a} f(x) = \infty, \lim_{x \rightarrow a} g(x) = \infty$ 이면 $\lim_{x \rightarrow a} \{f(x) - g(x)\} = 0$ 이다.

- ① ㉠ ② ㉡ ③ ㉠, ㉡ ④ ㉠, ㉢ ⑤ ㉠, ㉡, ㉢

45. 상수 a, b 에 대하여 함수 $f(x) = \begin{cases} a(x+3)^2 + 2b & (x \geq -1) \\ x^3 + 2 & (x < -1) \end{cases}$ 가 $x = -1$ 에서 미분가능할 때, $f(1)$ 의 값은? [2.1점]

- ① 2 ② 4 ③ 5 ④ 9 ⑤ 10

46. 곡선 $y = x^3 + 11$ ($x > 0$) 위를 움직이는 점 P 와 직선 $3x - y - 10 = 0$ 사이의 거리가 최소가 되게 하는 곡선 위의 점 P 의 좌표를 (a, b) 라 할 때, $b - a$ 의 값은? [2.1점]

- ① 11 ② 15 ③ 17 ④ 20 ⑤ 35

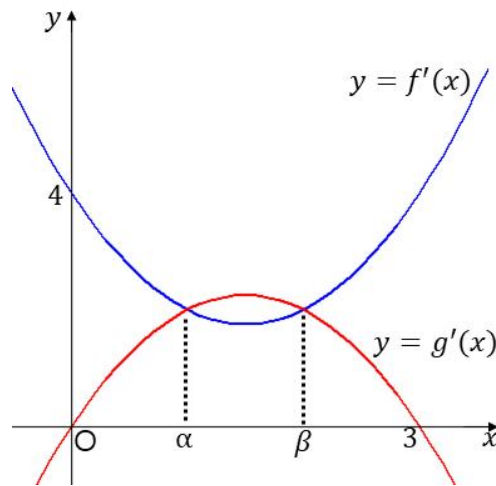
47. 수직선 위를 움직이는 두 점 P, Q 의 시간 t ($t > 0$)에서의 위치가 각각 $f(t) = \frac{2}{3}t^3 - 2t, g(t) = t^2 + 2t$ 이다. 두 점 P, Q 의 속도가 같아지는 순간 두 점 P, Q 사이의 거리는? [2.1점]

- ① $\frac{11}{3}$ ② $\frac{16}{3}$ ③ $\frac{20}{3}$ ④ $\frac{22}{3}$ ⑤ $\frac{25}{3}$

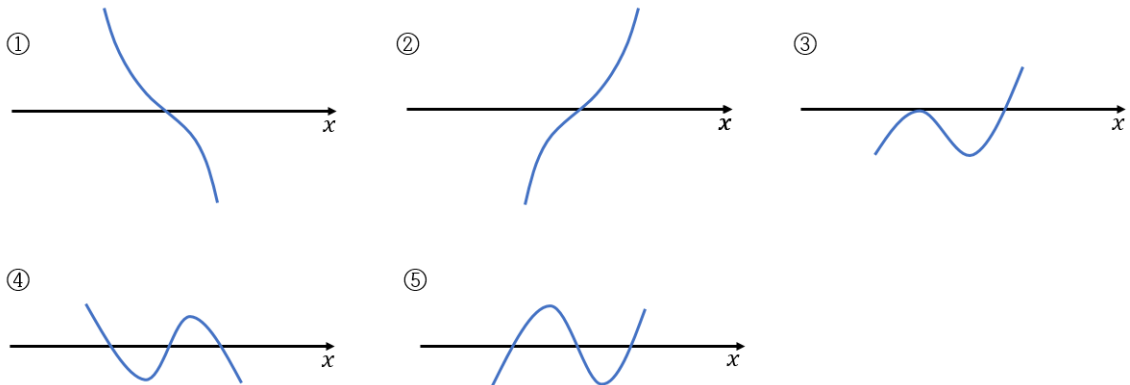
※ 48번~50번은 세트형 문제입니다. 아래 제시문을 보고 물음에 답하십시오.

두 삼차함수 $f(x), g(x)$ 의 도함수 $f'(x), g'(x)$ 의 그래프가 다음 그림과 같이 주어져 있을 때, 두 도함수의 그래프가 만나는 서로 다른 두 점의 x 좌표를 α, β ($0 < \alpha < \beta$)라 하고, $h(x) = f(x) - g(x)$ 라고 하자.

이 때, $f'(0) = 4, g'(0) = 0, g'(3) = 0, h(\beta) = 0$ 을 만족한다.



48. 함수 $f(x)$ 의 그래프의 개형으로 옳은 것은? [1.5점]



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

- ㉠ 함수 $h(x)$ 는 $x = \beta$ 에서 극솟값을 갖는다.
 ㉡ 방정식 $h(x) = 0$ 의 서로 다른 실근의 개수는 2개이다.
 ㉢ $0 < a < b < \beta$ 인 두 실수 a, b 에 대하여 $\frac{h(b) - h(a)}{b - a} < 4$ 이다.

- ① ㉠ ② ㉠, ㉡ ③ ㉠, ㉢ ④ ㉡, ㉢ ⑤ ㉠, ㉡, ㉢

50. $g'(x)$ 의 최고차항의 계수가 -1 이라고 하자. 삼차함수 $g(x)$ 의 극댓값을 M , 극솟값을 m 이라고 할 때, $M - m$ 의 값은? [2.1점]

- ① 0 ② $\frac{1}{2}$ ③ 1 ④ $\frac{7}{2}$ ⑤ $\frac{9}{2}$