
2023학년도
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]

Ashfalls can suffocate plants and poison livestock. But in the long term the ash is a(n) ___[1]___ to crops such as cauliflower, enriching the soil with minerals.

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

- (1) blessing (2) damage (3) herbicide (4) disturbance (5) impediment

[Question 2]

Satisfying their thirst at a dry season water hole on the Salamat River, elephants in Zakouma National Park have multiplied, with their numbers growing from 1,100 to around 3,500 during the past 21 years. However, outside the park, the scene is not so ___[2]___.

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

- (1) coarse (2) friendly (3) disastrous (4) abundant (5) malignant

[Question 3]

Mallory Martin, 14, joins the Annual Governor's Invitational Dove Hunt in Dickson, Tennessee. With the hunting population in decline and the sport under fire from animal rights advocates, hunting groups and wildlife agencies ___[3]___ to enlist a new generation.

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

- (1) forbid (2) force (3) strive (4) permit (5) encourage

[Question 4]

Some slopes in the Alps were all but unskiable in December 2006. Unseasonably high temperatures meant plenty of rain and mud but practically no snow. Dropping mercury early this year ___[4]___ that the European ski season was not a complete failure, but it was not enough to rescue the Abondance ski station in France. This year, the town's council voted to shut the facility because of a shortfall of snow.

4. Which best fits into the blank [4]? [2.1점]

- (1) intended (2) ensured (3) declined (4) reminded (5) persuaded

[Question 5]

Go ahead and have a cheeseburger, France's Constitutional Council said lately. The agency that supervises the constitutionality of laws was not ruling on nutrition but on linguistics. Its decision considerably weakens a recent law meant to stop the invasion of foreign words into the French language. That law ____ [5a] ____ the use of English in broadcasting, advertising, and science. The law would have, for instance, forced restaurateurs to advertise "hamburgers au fromage" instead of cheeseburgers. However, the Council ruled that the law ____ [5b] ____ on "the fundamental liberty of thought and expression" guaranteed by the French constitution.

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

- | | [5a] | | [5b] |
|-----|------------|-----|------------|
| (1) | banned | ... | encroached |
| (2) | banned | ... | leaned |
| (3) | endorsed | ... | encroached |
| (4) | endorsed | ... | leaned |
| (5) | disallowed | ... | depended |

[Question 6]

When you deposit money in a checking account, you are required to sign your name on a card, which the bank preserves so that if any other person attempts to get money by writing your name, the ____ [6a] ____ may be detected. The teller gives you a bankbook and a checkbook. The first shows the amount of your deposits, and every time you add money to your account, you take the book with you so the teller may enter your figures.

The checkbook contains the blank checks. When you wish to pay out money, you fill out one of them. For each check there is a stub for a memorandum of the particulars of the check and for addition and subtraction of amounts deposited and withdrawn. Your ____ [6b] ____ in the bank is found by subtracting from the amount of your deposits the amount of the checks you have drawn.

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

- | | [6a] | | [6b] |
|-----|---------|-----|---------|
| (1) | credit | ... | balance |
| (2) | credit | ... | debt |
| (3) | forgery | ... | balance |
| (4) | forgery | ... | debt |
| (5) | balance | ... | debt |

[Question 7]

The general store ____ [7a] ____ in the United States throughout the 19th century. It was a retail store in a small town or rural community that carried a wide variety of goods. Items commonly sold there included flour and white-bread. At times, a general store carried special items such as silk, clothing, and tableware from other countries. Food was not commonly sold at a general store because the pioneering colonies cultivated their own food.

Because the general store usually was located at a crossroads or in a village, it served as a meeting place for members of the community. The storekeeper was an important member not only because he supplied material goods but because he was also the source of news and gossip. Meanwhile, due to its ideal location, a general store had a ____ [7b] ____ on local trade. As such, it was able to keep prices high.

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

- | | [7a] | | [7b] |
|-----|----------|-----|----------|
| (1) | vanished | ... | sanction |
| (2) | vanished | ... | monopoly |
| (3) | emerged | ... | sanction |
| (4) | emerged | ... | monopoly |
| (5) | thrived | ... | sanction |

[Questions 8]

For the most part, it is generally presumed that an area's climate is static or unchanging. [I] That does not mean, however, that powerful weather events do not occasionally occur. Events such as storms, floods, and dry periods may regularly occur. [II] These may even be large events that affect the environment and possibly destroy natural resources in an area. [III] In spite of such events, the climate does not change. [IV] After storms or floods weather conditions return to normal. [V] Take, for example, seasonal storms and 100-year floods.

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

In fact, by studying weather events over a long period of time, certain events are seen to occur regularly.

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

[Questions 9-10]

At the turn of the 20th century in the United States, the General Land Office was responsible for maintaining the country's forest reserves. However, it was known for its incompetence and fraud. The Bureau of Forestry warned the government that if it did not provide protection, national forests would ____ [9] ____ in fifty years. It took time before the government finally enacted a bill. In 1905, with strong encouragement from President Theodore Roosevelt, an act of Congress transferred the Bureau of Forestry from the Department of the Interior to the Department of Agriculture. The Bureau of Forestry later became known as the Forest Service.

The Forest Service was established to protect and manage natural resources. [I] This research would provide valuable information to manage national forests. [II] The Forest Service also regulated logging operations of the lumber industry. [III] It ordered that only fifteen percent of the national forests could be cut for the lumber industry. [IV] The institution's role was to provide quality water and timber for the nation's benefit. [V] However, it could control only the national forests and had no control over forested areas belonging to the state or on private land.

9. Which of the following best fits into the blank [9]? [1.5점]

- (1) advance (2) extend (3) flourish (4) dwindle (5) augment

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

In addition, it was authorized to conduct research on all aspects of forestry, rangeland management, and forest resource utilization.

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

[Question 11]

Once indigenous to Kentucky and eastern states, elk were exterminated in the region in the 19th century. With money from the Rocky Mountain Elk Foundation, they have come back. Now thriving, the wild Kentucky herd numbers 6,500-enough for a limited hunting season.

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

- (1) aggressive (2) inadequate (3) native (4) relevant (5) responsive

[Question 12]

Statues of Nubian kings up to ten feet high were ____ [12] ____ buried at the Nubian capital of Kerma in Sudan.

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

- (1) guaranteed (2) regarded (3) proceeded (4) found (5) collapsed

[Questions 13]

Time whips by for horse trainer Tom King, who has only a hundred days to turn a wild mustang into a saddle horse suitable for adoption. His effort is part of the Extreme Mustang Makeover, a program launched in 2007 by the Mustang Heritage Foundation. That year the group found appropriate homes for 75 wild horses languishing in government holding facilities. "It took me ten days before I could walk up and touch Jimmy," King says. By day 12 King managed to stay in the saddle. By day 30 the pair was galloping across a Nevada range. Jimmy was sold for \$1,900.

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

- (1) suitable (2) launched (3) languishing (4) to stay (5) was galloping

[Question 14]

Co-evolution is on vivid display in the Sierra Nevada foothills, where a hummingbird feeds from a scarlet monkey flower. Hummingbirds are virtually the only creatures that visit this flower species. Both species benefit: The bird gets fed and the flower gets pollinated. Why no bees? "Bees may be rare or absent when the monkey flower evolved," says Michigan State biologist Douglas Schemske. It is also possible that the plants were widely dispersed, more easily reached by birds than bees, which tend to take shorter trips.

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

- (1) where (2) species (3) fed (4) be (5) which

[Questions 15-16]

Each year millions of monarch butterflies migrate from Canada and the U.S. to their winter grounds in mountainous central Mexico. The sight of forests swarming with them is world famous. However, those great gatherings may not ____ [16a] _____. Recent satellite images show that from 2004 to 2008 illegal logging in the Monarch Butterfly Biosphere Reserve cleared more than a thousand acres, leaving the butterflies dangerously exposed during a crucial period of rest and reproduction. Lincoln Brower, a biologist at Sweet Briar College, warns that the images show only part of a widespread problem-one that has gone unchecked for decades and is worsening. But attention may mean relief: In July UNESCO ____ [16b] ____ World Heritage status on the reserve, which Brower hopes will prompt a crackdown on logging. "It's got to stop," he says, "or the butterflies will go right down the drain."

15. Which of the underlined words is grammatically incorrect? [2.8점]

- (1) migrate (2) swarming (3) exposed (4) warns (5) unchecked

16. Which best fits into the blank [16a] and [16b]? [2.1점]

- | | [16a] | | [16b] |
|-----|-----------|-----|----------|
| (1) | cease | ... | bestowed |
| (2) | cease | ... | obtained |
| (3) | last | ... | bestowed |
| (4) | last | ... | obtained |
| (5) | disappear | ... | bestowed |

[Questions 17-18]

In the past, zoos were managed in a dangerous way. Zookeepers were only concerned with keeping animals in their cages. [I] If an animal was unable to produce offspring, the zookeepers would simply capture new animals rather than breed the existing animals. [II] Furthermore, the animals were given food that was ___[17a]___ instead of nourishing food that would keep them healthy. [III]

Present standards and methods at zoos comply with laws made on exhibiting animals. [IV] Only persons who have a certificate in the capture, handling, and care of animals are hired as zookeepers. [V] Courses offered at universities for prospective zookeepers include such subjects as species management, animal behavior, and zoo workplace environment and safety. With these efforts, zoo animals are now receiving balanced meals and also have a landscape that ___[17b]___ their needs for play just like in the wild.

17. Which best fits into the blank [17a] and [17b]? [2.1점]

- | | [17a] | | [17b] |
|-----|-------------|-----|------------|
| (1) | unwholesome | ... | suppresses |
| (2) | unwholesome | ... | suits |
| (3) | nutritious | ... | suppresses |
| (4) | nutritious | ... | suits |
| (5) | unhealthy | ... | suppresses |

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

However, as zoo animals began to die off, it became necessary to give the animals proper care.

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

[Question 19-20]

The rise in world population has been both a blessing and a curse. Between 1930 and 1975, global population increased from two to four billion persons. In the next eighteen years, it increased to five and a half billion. The sharpest increases have generally been in developing nations that are least able to provide food, education, and jobs for all. Disputably, averting world famine depends on the relatively few countries able to export food; literally millions of hungry souls count on them. Many nations, like Indonesia and Thailand, now have effective population control programs, but the control of contagious diseases and an increase in the food supply have combined to encourage population growth. Demographers vary widely in their estimates of the earth's maximum sustainable population, but they all agree that population control is a necessity and that there are limits to the planet's capacity. Excessive population density and overcrowding have been implicated in a variety of ills ranging from increased crime and pollution to environmental degradation and political instability. One of the most significant challenges for human beings is to control the ticking population time bomb.

19. Which of the following is closest in meaning to the underlined word "averting"?

[1.5점]

- (1) obviating (2) facilitating (3) replenishing (4) devastating (5) substituting

20. According to the passage, which of the following is NOT a possible consequence of an unmanageable increase in world population? [2.1점]

- (1) Political disorder
(2) Rising criminal rates
(3) Global contamination
(4) Environmental disruptions
(5) Containment of contagious diseases

[Questions 21-22]

Insects live in every part of the world except the North and the South Poles. Fossil records indicate that many species exist today in much the same form as they ____ [21a] ____ 200 million years ago. Their enormous biological accomplishment is ascribed to their small size, the remarkable adaptive abilities of the group as a whole and the immense variety in body structure and way of life. The mouth parts may be adapted for chewing, sucking or lapping and the legs for running, jumping or swimming. Insects may feed on plants or prey upon other small animals or parasitize larger ones. They may be omnivorous or highly specialized in their diets. They display a remarkable variety of adaptive shapes and colors that may serve as camouflage. Some of them have stinging spines or hair and blistering or ____ [21b] ____ secretions used for defense.

21. Which best fits into the blank [21a] and [21b]? [2.8점]

- | | [21a] | | [21b] |
|-----|-------|-----|-----------|
| (1) | did | ... | innocuous |
| (2) | did | ... | noxious |
| (3) | were | ... | innocuous |
| (4) | were | ... | noxious |
| (5) | had | ... | innocuous |

22. It can be inferred from the passage that insects have achieved to maintain their existence for a very long time _____. [2.1점]

- (1) but they are not likely to live much longer
- (2) thanks to their size and their adjustable abilities
- (3) as a result of the way they are able to protect themselves
- (4) due to being able to live on all other living organisms as parasites
- (5) though they have not been able to become adaptable to any kind of environment

[Questions 23]

Animals began to be used for work long before humankind started to practice agriculture. The use of animal labor is now deemed by many people to be archaic and ineffective. However, despite the more than 40 years spent promoting tractorization in underdeveloped countries, the growth gap between industrialized countries and those with weak, highly dependent economies has increased. Moreover, the use of current production models, which are more critically reliant on fossil fuel, cannot be deemed universally feasible. Alternative energy sources such as the effective use of working animals must urgently be established. Animals not only provide the means by which millions of families make a living, but they also contribute to ecologically and socially acceptable production systems. Furthermore, the efficiency of their energy inputs into crop production is higher than that of machines. The rational use of working animals has the potential to contribute, specifically, to the living conditions and security of small-scale subsistence farmers.

23. It is maintained in the passage that the use of animal power _____. [2.8점]

- (1) is to be encouraged as a substitute source of energy
- (2) is not appropriate for small-scale subsistence farmers
- (3) has never been implemented for almost 40 years now
- (4) is not a practical method in a lot of developing countries
- (5) has never been more prevalent and preferred before than it is nowadays

[Questions 24]

Global electricity demand is growing so fast that over the next decade our generating capacity must multiply by a third. Fossil fuels supply approximately three-quarters of this energy. But the smoke emitting coal, gas, and oil-fired plants are also responsible for half of our air pollution. That might be viewed as a small price to pay for progress. But there is an alternative, one that produces no smoke and can actually create more fuel than it consumes. In many regions it is even cheaper than coal-fired electricity: nuclear power. It might directly bring danger of radioactivity to the mind, but if other types of power did not present equal and even worse problems, it would make no sense to consider nuclear power at all. But they do.

24. According to the passage, the writer is concerned that in the future _____. **[2.8점]**

- (1) there does not exist a better option than fossil fuels
- (2) there will always be potential dangers of nuclear power
- (3) they will have to construct nuclear power stations one day
- (4) nuclear waste is certain to be more hazardous than air pollution
- (5) fossil-based power plants could trigger bigger problems than nuclear energy

[Questions 25]

The National Health Service was established in 1948 shortly after the end of World War 2. Its aim is to provide free medical treatment for all patients who wish to take advantage of the service. However, it is still possible to obtain private medical treatment and in this case the doctor charges a fee. It is not entirely true to say that the National Health Service is free. Every employed or self-employed person over sixteen years of age must put a stamp on an insurance card every week. This card is issued by a government department called the Department of Health and Social Security. The stamp costs money and the amount is constantly changing. Part of the cost of this stamp, in fact the greater part, is borne by the employer and it finances the National Health Service together with many other social security benefits.

25. It is stated in the passage that _____. **[2.8점]**

- (1) free medical care is valid for the employees who are over sixteen years old as well
- (2) self-employed people's expenses are completely paid by the National Health Service
- (3) people should pay additional money if they want to obtain advantages other than medical cure
- (4) the exclusive aim of the Department of Health and Social Security is to provide free medical treatment
- (5) people over sixteen can receive welfare benefit on condition that they stick the stamp on the insurance card.

26. 연달아 있는 세 개의 네모 $\square\square\square$ 를 빨강, 노랑, 파랑, 보라의 네가지 색으로 칠하려고 한다. 같은 색을 중복하여 사용해도 좋으나 인접한 네모는 서로 다른 색으로 칠하는 방법의 수를 구하면? [1.5점]

- (1) 12 (2) 24 (3) 36 (4) 48 (5) 64

27. 세 자연수 l, m, n 을 다음과 같이 정의하자.

- 집합 $X = \{1, 2, 3\}$ 에서 집합 $Y = \{4, 5, 6, 7, 8, 9\}$ 으로의 함수 f 중에서
- l 은 $a < b$ 이면 $f(a) < f(b)$ 인 함수 f 의 개수
 - m 은 $f(a) = f(b)$ 이면 $a = b$ 인 함수 f 의 개수
 - n 은 치역의 원소의 개수가 2인 함수 f 의 개수

l, m, n 의 대소 관계를 올바르게 나타낸 것은? [2.1점]

- (1) $l = m < n$ (2) $l < n < m$ (3) $m < l = n$ (4) $l < m = n$ (5) $m < l < n$

28. 자연수 n 에 대하여, n 개의 서로 다른 카드에서 k ($0 \leq k \leq n$) 개의 카드를 고르는 경우의 수를 a_k 라고 하자. 다음 중에서 옳은 것만을 있는 대로 고른 것은? [2.8점]

- ㉠ $0 < 2l < 2k \leq n$ 이면 $a_l < a_k$ 이다.
 ㉡ $a_k = a_{n-k}$ 이다.
 ㉢ n 이 짝수이고 $0 < k < n$ 이면 a_k 는 짝수이다.

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

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

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

30. 1이 아닌 모든 실수 x 에 대하여 $\frac{x^3+3x^2-1}{(x^2+x+1)(x-1)} = a + \frac{bx+c}{x^2+x+1} + \frac{d}{x-1}$ 이 성립할 때, $a+b$ 와 $c+d$ 의 값을 차례로 구하면? [1.5점]

- (1) 3, 2 (2) 7, 2 (3) -3, 5 (4) -3, 2 (5) -8, 13

31. 전체집합 U 에 대하여 세 조건 p, q, r 의 진리집합을 각각 P, Q, R 라고 하자. 두 명제 $q \rightarrow p$ 와 $\sim r \rightarrow \sim p$ 가 모두 참일 때, 항상 옳은 것만을 있는 대로 고른 것은? [2.1점]

$\textcircled{\neg} \quad Q \subset P$	$\textcircled{\supset} \quad P^C \subset R^C$	$\textcircled{\subset} \quad (P \cup Q) \subset R^C$	$\textcircled{\supset} \quad P^C \cap R^C \subset Q^C$
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- (1) $\textcircled{\supset} \textcircled{\supset}$ (2) $\textcircled{\neg} \textcircled{\supset}$ (3) $\textcircled{\neg} \textcircled{\supset} \textcircled{\supset}$ (4) $\textcircled{\neg} \textcircled{\supset} \textcircled{\supset}$ (5) $\textcircled{\neg} \textcircled{\supset}$

32. 함수 $f(x) = \sqrt{2x-2} + 1$ 의 역함수를 $g(x)$ 라고 할 때 두 함수 $y = f(x)$ 와 $y = g(x)$ 의 그래프의 두 교점 사이의 거리를 구하면? [1.5점]

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

33. 이차부등식 $f(x) > 0$ 의 해가 $-3 < x < 4$ 일 때, 부등식 $f(-x+3) < 0$ 의 해를 구하면? [1.5점]

- (1) $-4 < x < 3$ (2) $-6 < x < -1$ (3) $x < -1$ 또는 $6 < x$
 (4) $x < 3$ 또는 $4 < x$ (5) 해는 존재하지 않는다.

34. 방정식 $x^3 - 1 = 0$ 의 한 허근을 ω 라고 할 때, $\omega^4 + 2\omega^2 + 3 = a\omega + b$ 이다. 실수 a, b 의 값을 차례로 구하면? [1.5점]

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

35. 다음 부등식 중에서 모든 실수 x 에 대하여 성립하는 것을 있는 대로 고른 것은? [2.8점]

$\textcircled{\text{㉠}} \quad x^2 + x \geq 1$	$\textcircled{\text{㉡}} \quad 1 \leq \frac{3^x + 3^{-x}}{2}$	$\textcircled{\text{㉢}} \quad -x^2 + 2x < 2$	$\textcircled{\text{㉣}} \quad x^4 - x^2 \geq -0.25$
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- (1) $\textcircled{\text{㉠}} \textcircled{\text{㉡}}$ (2) $\textcircled{\text{㉠}} \textcircled{\text{㉢}}$ (3) $\textcircled{\text{㉢}}$ (4) $\textcircled{\text{㉠}} \textcircled{\text{㉢}}$ (5) $\textcircled{\text{㉡}} \textcircled{\text{㉢}} \textcircled{\text{㉣}}$

36. 다음 중에서 함수 $f(x) = \log|x-1| + 2$ 에 대한 설명으로 옳은 것만을 있는 대로 고른 것은? [1.5점]

- | |
|---|
| $\textcircled{\text{㉠}}$ 정의역은 실수 전체의 집합이다.
$\textcircled{\text{㉡}}$ 치역은 실수 전체의 집합이다.
$\textcircled{\text{㉢}}$ $x > 1$ 일 때, $f(x)$ 는 증가 함수이다.
$\textcircled{\text{㉣}}$ 그래프는 직선 $x = 1$ 에 대해 대칭이다. |
|---|

- (1) $\textcircled{\text{㉡}} \textcircled{\text{㉢}}$ (2) $\textcircled{\text{㉢}} \textcircled{\text{㉣}}$ (3) $\textcircled{\text{㉠}} \textcircled{\text{㉢}}$ (4) $\textcircled{\text{㉡}} \textcircled{\text{㉢}} \textcircled{\text{㉣}}$ (5) $\textcircled{\text{㉢}}$

37. 실수 α, β 에 대하여 함수 $f(x) = \sin^2\left(x - \frac{\pi}{3}\right) - \sin\left(x + \frac{2\pi}{3}\right) + \alpha$ 의 최댓값은 3, 최솟값은 β 이다. $\alpha + \beta$ 의 값은? [2.8점]

- (1) $\frac{7}{4}$ (2) $\frac{1}{4}$ (3) 1 (4) $-\frac{1}{2}$ (5) $-\frac{5}{4}$

38. 등비수열 $\{a_n\}$ 의 첫째항부터 제 n 항까지의 합을 S_n 이라 하자. 모든 자연수 n 에 대하여 $S_{n+2} - S_n = 100 \times 3^{-n}$ 일 때, a_3 의 값을 구하면? [2.1점]

- (1) $\frac{25}{3}$ (2) $\frac{25}{2}$ (3) 25 (4) 50 (5) 75

※ 39번~42번은 세트형 문제입니다. 아래 제시문을 보고 물음에 답하십시오.

두 점 A와 B가, 각각 $(10, 0)$ 과 $(-5, 5)$ 에서 출발하여 다음과 같이 좌표평면 위를 움직인다.

- A는 x 축 위를 움직이며 t ($t \geq 0$)분 후의 속도 $v(t)$ 는

$$v(t) = \begin{cases} 10t & (0 \leq t \leq 1) \\ -2t + 12 & (1 < t \leq 7) \\ -2 & (7 < t) \end{cases} \text{ 이다.}$$

- B는 직선 $y = -x$ 위를 1분 당 $\sqrt{2}$ 만큼씩 일정한 속도로, x 좌표가 증가하는 방향으로 움직인다.

39. $t = 0$ 에서 $t = 7$ 까지 점 A가 움직인 총 거리는? [2.1점]

- (1) 21 (2) 12 (3) 29 (4) 30 (5) 31

40. $t = 0$ 일 때, 두 점 A, B, 그리고 원점 O에 대하여 $\angle OAB$ 의 크기를 θ 라고 할 때, $\cos \theta$ 의 값을 계산하면? [2.1점]

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

41. $t = 7$ 일 때 A와 B의 좌표를 차례로 구하면? [2.1점]

- (1) $(39, 0), (\sqrt{2}, -\sqrt{2})$ (2) $(\frac{43}{3}, 0), (\sqrt{2}, -\sqrt{2})$ (3) $(16, 0), (2\sqrt{2}, -2\sqrt{2})$
 (4) $(16, 0), (\frac{5\sqrt{2}}{2}, -\frac{5\sqrt{2}}{2})$ (5) $(39, 0), (2, -2)$

42. 7분 이후 ($t > 7$) 점 A와 점 B가 가장 가까워지는 때의 t 에 대하여 $t - 7$ 을 구하면? [2.8점]

- (1) 14 (2) $\frac{137}{10}$ (3) 11 (4) $\frac{109}{10}$ (5) $\frac{22}{3}$

43. 다음 중에서 함수 $f(x) = x^4 + x^3 + x^2 + x + 1$ 에 대한 설명으로 옳은 것만을 있는 대로 고른 것은? [2.1점]

- ㉠ $\lim_{x \rightarrow 1} \frac{f(x) - f(1)}{x^2 - 1}$ 의 값이 존재한다.
 ㉡ $f(a) = 0$ 인 양의 실수 a 가 존재한다.
 ㉢ $f(b) = 2$ 를 만족하는 b 가 열린구간 $(0, 1)$ 에 존재한다.
 ㉣ $f'(c) = 4$ 을 만족하는 c 가 열린구간 $(0, 1)$ 에 존재한다.

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

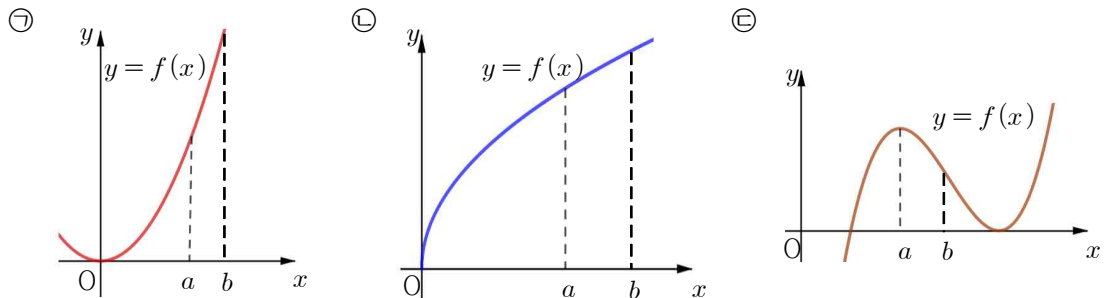
44. 함수 $f(x) = x^3 - x + 1$ 에 대하여 곡선 $y = f(x)$ 에 접하고 기울기가 2인 두 직선 사이의 거리는? [1.5점]

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

45. $\lim_{x \rightarrow \infty} \frac{1}{\sqrt{x^2 + 3x} - x}$ 와 $\lim_{x \rightarrow -2} \frac{\sqrt{x+4} - \sqrt{2}}{x^2 - 4}$ 의 값을 차례로 구하면? [1.5점]

- (1) $\frac{5}{4}, \frac{1}{4}$ (2) $\frac{2}{3}, -\frac{1}{4}$ (3) $\frac{1}{3}, -\frac{\sqrt{2}}{8}$
 (4) $0, \infty$ (존재하지 않는다) (5) $\frac{2}{3}, -\frac{\sqrt{2}}{16}$

46. 주어진 함수 $y = f(x)$ 의 그래프 중에서 $a < x < b$ 일 때 $\frac{f(x) - f(a)}{x - a} \leq f'(a)$ 을 항상 만족시키는 것만을 있는 대로 고르면? [2.1점]



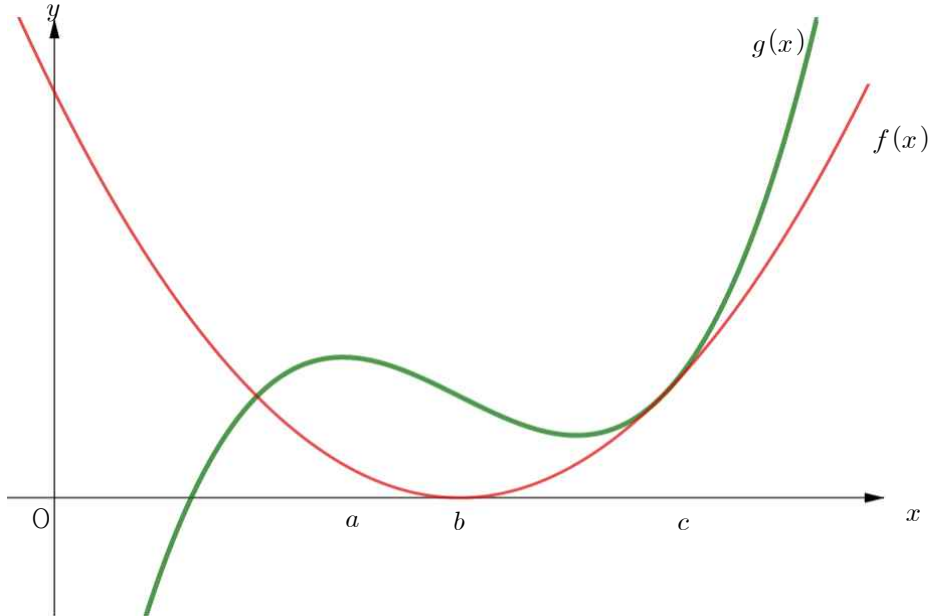
- (1) ㉠ (2) ㉠ ㉡ ㉢ (3) ㉠ ㉢ (4) ㉡ ㉢ (5) ㉢

※ 47번~50번은 세트형 문제입니다. 아래 제시문을 보고 물음에 답하십시오.

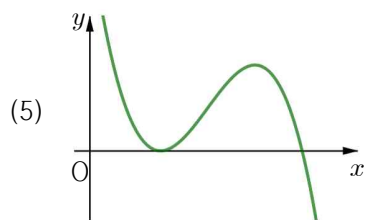
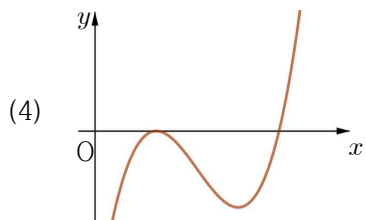
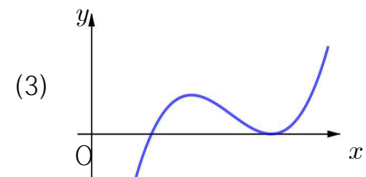
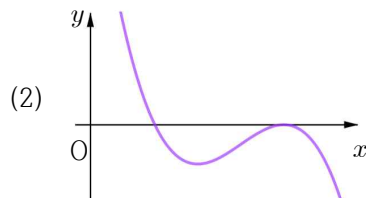
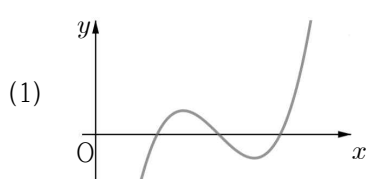
이차함수 $f(x)$ 와 삼차함수 $g(x)$ 의 그래프가 다음 그림과 같이 주어져 있을 때,

$$p(x) = f(x) - g(x), \quad q(x) = f(x)g(x), \quad h(x) = \int_0^x p(t) dt \quad \text{라고 하자.}$$

이 때, 점 a, b, c 는 각각 $g'(a) = 0$, $f'(b) = 0$, $f(c) = g(c)$, $f'(c) = g'(c)$ 를 만족한다.



47. 함수 $p(x)$ 의 그래프로 옳은 것은? [2.1점]



48. $q'(b)$ 와 $q'(c)$ 의 값에 대한 설명으로 옳은 것은? [1.5점]

- (1) $q'(b) = 0, q'(c) > 0$ (2) $q'(b) = 0, q'(c) = 0$ (3) $q'(b) > 0, q'(c) < 0$
 (4) $q'(b) < 0, q'(c) < 0$ (5) $q'(b) > 0, q'(c) > 0$

49. 함수 $h(x)$ 에 대한 다음 설명 중 옳은 것만을 있는 대로 고른 것은? [2.1점]

- ㉠ 함수 $h(x)$ 는 열린 구간 $(0, \infty)$ 에서 감소한다.
 ㉡ $h(x) = 0$ 이 되는 x 가 열린 구간 $(0, \infty)$ 에 존재한다.
 ㉢ 함수 $h(x)$ 는 모든 양의 실수 x 에서 미분 가능한 함수이며 $h'(x) = p(x)$ 이다.

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

50. 함수 $h(x)$ 에 관한 설명으로 옳은 것은? [2.8점]

- (1) $x = c$ 일 때 최솟값을 갖는다.
 (2) 최댓값을 갖는 실수 x 가 열린구간 $(0, a)$ 에 존재하고 최솟값은 갖지 않는다.
 (3) $x = a$ 일 때 최댓값을 가지고 $x = c$ 일 때 최솟값을 갖는다.
 (4) 최댓값을 갖는 실수 x 가 열린구간 $(0, a)$ 에 존재하고 $x = c$ 일 때 최솟값을 갖는다.
 (5) 최댓값과 최솟값은 존재하지 않고, $x = c$ 일 때 극솟값을 갖는다.