

2026학년도
아주대학교 편입학 수강능력시험

자연계열



성명	
전형	
수험번호	



Questions 1-2: Choose the expression that best completes the sentence.

1. (1.0 points) An aspect of cultural shock that can have adverse effects upon the newcomer to a culture is social alienation and feelings of loneliness associated with being isolated from friends and home culture. Feelings of alienation may be delayed somewhat because concerns over _____ housing, transportation, and work may bugger these feelings initially.

- ① such basic matters as
- ② as basic matters such
- ③ as such basic matters as
- ④ such as basic matters as
- ⑤ such basic as matters as

2. (1.0 points) Though no one doubts that our thoughts and feelings are caused by the activity of the brain, that activity has been hard to study because most people don't want to hand over their brain to science until they are dead. We infer _____ by seeing what the whole person does when presented with inputs such as pictures, words, or instructions.

- ① what must be doing of the brain parts
- ② parts of what must be doing the brain
- ③ that what brain parts must be doing
- ④ what parts of the brain must be doing
- ⑤ that must be doing parts of the brain

Questions 3-5: Choose the word that best completes the sentence.

3. (0.8 points) When receiving an answer from chatbots, always remain _____ and question the incoming information. This is important because AI is prone to "hallucinations" (generating false information with high confidence).

- ① compliant
- ② inauthentic
- ③ naive
- ④ skeptical
- ⑤ uncritical



4. (0.8 points) An extensive new analysis looks at the environmental footprint of data centers in the U.S. to get a handle on what exactly the country might be facing as this buildout continues over the next few years and where the U.S. should be building data centers to avoid the most harmful environmental _____.

- ① benefits
- ② impacts
- ③ indicators
- ④ processes
- ⑤ revelations

5. (0.8 points) Taylor Swift and Travis Kelce announced their engagement on Instagram, calling themselves “your English teacher and your gym teacher,” a playful nod to the roles fans imagine them in. Fans’ emotional reactions highlight parasocial relationships, one-sided bonds people form with celebrities. Swift has cultivated these ties through constant music releases, Easter eggs, fan interactions, and a carefully _____ yet authentic public image.

- ① adhered
- ② interrupted
- ③ crafted
- ④ deciphered
- ⑤ obscured

Questions 6-7: Choose the underlined word or phrase that must be changed for the sentence to be correct.

6. (1.0 points) Global managers need feedback and rewards just as ①managers in the home culture do. The appraisal and reward system is different from the home system because people doing overseas assignments ②have to be evaluated and rewarded in the way that takes into account the values of persons in the host culture and the expectations of a particular assignment. The evaluation criteria must be made clear. ③Areas are typically included leadership ability, interpersonal skills, and achievement of organizational objectives. For international managers, ④a key factor to be evaluated often includes profits, but in some countries, the main goal might be ⑤to build a presence in the country. In that case, making contacts and building close personal relationships with key officials in the host country are important.



7. (1.0 points) The acclaimed Japanese director Akira Kurosawa, ①starting in the mid-1930s, worked his way up from an assistant director at Toho, one of Japan’s pre-eminent studios ②which then called PCL Cinema Studio. In subsequent years, his work would proudly exhibit a broad range of influences, including several Shakespearean adaptations and a film based on *The Idiot* by Dostoyevsky, ③who, Kurosawa thought, “writes most honestly about human existence.” Kurosawa translated his early Japanese success into international interest with films like *Drunken Angel* (1948) and *Stray Dog* (1949), and by 1952, his *Rashomon* was voted the finest foreign film at the 24th Academy Awards. ④Buoyed by this international recognition, Kurosawa embarked on ⑤what would become one of his most ambitious and enduring works: *Seven Samurai*.

Questions 8-9: Choose the number with the correct set of statements that can be restated or inferred from the original text.

8. (1.1 points) An extensive study by the Boston Consulting Group (BCG) identifies fifty firms in ten emerging economies as “local dynamos.” According to BCG, a local dynamo prospers in its home market, fends off multinational rivals, and is not focused on expanding abroad. India’s Amul farmers’ cooperative sells dairy products through a network of 2.8 million members supported by one of the longest-running and best-loved ad campaigns in India. Its ice-cream and chocolate milk businesses have survived the entry of Unilever and Nestle, respectively. Brazilian budget airline Gol has targeted thrifty Brazilian consumers willing to sacrifice convenience for price; planes often depart at odd hours and make multiple stops. According to BCG, local dynamos often combine an in-depth understanding of consumer tastes with cost-effective production techniques to create a locally laser-focused business model.



- (a) The competitiveness of firms like Amul and Gol depends on global scale and branding.
- (b) BCG suggests that local dynamos mainly use domestic success as a foundation for future international expansion.
- (c) Local dynamos concentrate on strengthening their position within their home countries.
- (d) Local dynamos are successful firms that dominate their domestic markets while withstanding competition from global multinational companies.

- ① (a) & (b)
- ② (b) & (c)
- ③ (c) & (d)
- ④ (a), (c) & (d)
- ⑤ (b), (c) & (d)

9. (1.1 points) Fire-making is a uniquely human innovation that stands apart from other complex behaviors such as tool production, symbolic culture, and social communication. Controlled fire use provided adaptive opportunities that had profound effects on human evolution including warmth, protection from predators, cooking, and the creation of illuminated spaces that became focal points for social interaction. Fire use developed over a million years, progressing from the harvesting of natural fire to its maintenance and ultimately to deliberate fire-making. However, determining when and how fire use evolved remains challenging because natural and anthropogenic burning are hard to distinguish. Although geochemical methods have improved interpretations of heated deposits, unequivocal evidence of deliberate fire-making has remained elusive.

- (a) Fire-making technology likely enhanced social cohesion by creating illuminated spaces that promoted social interaction.
- (b) The use of fire simultaneously contributed to multiple survival advantages including safety, nutrition, and social organization.
- (c) The development of fire-making represents a gradual technological process rather than a sudden innovation.
- (d) Advances in geochemical analysis have made it possible to clearly distinguish intentional fire-making from naturally occurring fires in the archaeological records.

- ① (a), (b) & (c)
- ② (b), (c) & (d)
- ③ (a), (c) & (d)
- ④ (a) & (b)
- ⑤ (c)



Questions 10-25: Read each passage and answer the corresponding questions for each.

※ Questions 10 through 13 are based on the following passage.

[A] On Mount Olympus, sometime around 800-900 BC, the gods and goddesses of Ancient Greece were served sweet nectar and ambrosia by Hebe, the goddess of immortal youth. A beautiful young woman, Hebe was symbolic of being in the “prime of life.” Her counterpart, Geras, the god or spirit of old age, **(a) was depicted as a haggard and wrinkled man**, often leaning on a walking stick. ❶ Instead of beauty, he represented biological decline and the fear of death. Together, Hebe and Geras are just **(b) one of the many representations** of ageing in our culture and history that serve as a reminder that no one can escape the passing of time.

[B] Humanity’s obsession with youthfulness has only intensified since Ancient Greece. Our skin, a living ecosystem, is at the center of this; **(c) not only is it the largest organ** in the body, but it’s also visible. Or as one group of researchers in France put it, “social.” ❷ In fact, in their study of 1,300 people across fifty four countries, 85% of the participants felt that their skin reflected their personality, suggesting it is tied in with their sense of self. Much like our other organs, skin ages from the moment we are born. The global anti-ageing products market size was valued at approximately \$52 billion in 2024 and is expected to reach \$80 billion by 2030. But why do we try to resist an ageing face and how can we embrace it?

[C] Our skin is incredible, really. ❸ While only a few millimeters thick, it makes up about 15% of our total body weight. “The skin is a very important organ **(d) that we take it for granted**, even though it’s the organ we wear externally,” says George Murphy, a professor at Harvard Medical School. “The skin protects us; it’s the major interface to the external environment, which is often hostile.” Our skin acts as a barrier from germs, infections, physical trauma, or anything else that might harm us, like UV from the sun. ❹ “It does so many different things that are absolutely critical to life,” Murphy says. “If you lose most of your skin, usually that’s fatal.”

[D] Our skin ages both intrinsically and extrinsically. In both cases, our collagen levels decrease and our blood vessels become more fragile. “What happens with our skin when we age is that it loses many of the structural and functional components that are designed to protect us,” says Murphy. ❺ Over time, our stem cells start to regenerate at a slower rate, which affects the functioning of each of the three layers of the skin: the epidermis (the outer layer), the dermis (the middle layer), and the subcutis (made of fat and connective tissue). Essentially, our skin thins, dries, and loses elasticity. This explains why as we get older, our skin is less able to protect us; for example, **(e) wounds take longer to heal**.



10. (1.0 points) Which of the following would be the best title for the passage above?

- ① Fashion Trends and Standards of Physical Attractiveness in Human Skin
- ② Cultural Meaning and the Aging of Human Skin
- ③ Cosmetic Practices and the Rise of Global Beauty Markets for Human Skin
- ④ Lifestyle Choices and Environmental Pollution in Human Skin
- ⑤ Medical Disorders and Dermatological Treatments for Human Skin

11. (1.1 points) According to the passage above, which of the following is NOT true?

- ① Because skin is visible to others, it also carries social meaning.
- ② Anxiety about the invisible signs of ageing reflects the use of anti-ageing products.
- ③ Human cultures have long associated youth with beauty and old age with decline.
- ④ As people age, their skin becomes less effective at protecting the body from infections.
- ⑤ Skin plays a central role in how individuals perceive and present themselves to others.

12. (1.0 points) Which part must be changed for the sentence to be correct?

- ① (a) was depicted as a haggard and wrinkled man
- ② (b) one of the many representations
- ③ (c) not only is it the largest organ
- ④ (d) that we take it for granted
- ⑤ (e) wounds take longer to heal

13. (1.0 points) The following sentence is removed from the passage above. In which part may it be inserted to support the argument made by the author?

It also regulates our body temperature and produces hormones and vitamins.

- ① ①
- ② ②
- ③ ③
- ④ ④
- ⑤ ⑤



※ Questions 14 through 17 are based on the following passage.

[A] Demonstrably false claims about asylum seekers and other migrants in 2024 raced across the internet and prompted riots, threats, and other episodes with tangible impacts on immigrant and minority communities. This type of misinformation often exploits underlying anxieties about immigration, the economy, and crime. The spread was facilitated by social media, where unverified rumors can spread unchecked. Most destructive were social-media-spread claims in the United Kingdom in which the suspect in a tragic stabbing attack on young girls in July was a Muslim asylum seeker who had arrived on a small boat across the Channel. In fact, the (a) **alleged** killer was a British national born to a church-going family in Wales. (b) **Incited** by the false news, mobs launched attacks on mosques, a hotel housing asylum seekers, and other facilities, which injured several police officers and bystanders. This led to more than 100 arrests.

[B] The viral nature of the misinformation, in particular, is the case on platforms such as X, which has become notably more tolerant of extremist voices since its acquisition by Elon Musk, a close ally of Donald Trump. Social media is also allegedly used by governments such as Russia, which have been accused of sowing migration-related lies to cause instability and undermine geopolitical opponents. The rise of artificial intelligence is also a factor, by blurring the line between legitimate news organizations and websites that generate pure fiction. This dynamic reflects a distrust in institutions globally, which can create fertile ground for untruths to blossom.

[C] Immigration was a major theme of the U.S. presidential election, where false claims featured prominently and regularly. Trump falsely claimed, during a debate, that Haitian immigrants in a small city in Ohio were “eating the dogs” and “eating the cats” of local residents. In the following days, schools and other institutions received dozens of bomb threats that caused many residents to live in fear and prompted the city to cancel an annual cultural event. Trump and his allies also seeded fears that large numbers of noncitizens would vote in the November election. It has been illegal for noncitizens to vote in U.S. federal elections for a century and there is no evidence that any meaningful number do so.

[D] Many false claims hinged on the notion that migrants were disproportionately likely to commit crimes. (1) _____. Similar narratives (c) **underpinned** restrictive policies in countries such as Peru, where authorities began monitoring (d) **remittances** that Venezuelan migrants sent back to their homeland as part of an effort to (e) **crack down** on crime and extortion. As elsewhere, evidence suggests that Venezuelan migrants commit less crime than the native born, particularly violent crime, relative to their population size.



14. (1.0 points) Which of the following would be the best title for the passage above?

- ① Misinformation About Migrants and Its Consequences
- ② Public Attitudes Toward Immigration and National Identity
- ③ Migration Policies and Their Economic Impact on Host Countries
- ④ The Growth of Social Media Platforms on Global Political Campaigns
- ⑤ Artificial Intelligence and the Changing Environment of Online Journalism

15. (0.8 points) Which of the following pairs includes an expression that CANNOT replace the underlined expression in the passage above?

- ① (a) **alleged**, supposed
- ② (b) **incited**, triggered
- ③ (c) **underpinned**, supported
- ④ (d) **remittances**, money sent home
- ⑤ (e) **crack down**, pay attention to

16. (1.1 points) Which of the following would best fit in blank (1) in paragraph [D]?

- ① The claim circulated widely in European media discussions about the economic impact of immigration and asylum seeking.
- ② This belief gained widespread attention through online debates about border control and national security.
- ③ Such arguments were frequently repeated by political figures during debates on social reforms.
- ④ This narrative reduced existing public discourses about migration in several European countries.
- ⑤ A version of this line was linked to attacks on migrants in Portugal and echoed in protests calling for stricter immigration laws.

17. (1.1 points) According to the passage above, which of the following is true?

- ① Evidence from multiple countries shows that migrants are more likely than native-born citizens to commit violent crimes.
- ② False claims about migrants spread online have led to real-world violence, fear, and policy responses in several countries.
- ③ The stabbing attack in the United Kingdom was confirmed to have been carried out by a recently arrived Muslim asylum seeker.
- ④ Authorities in Peru began monitoring migrant remittances mainly to support migrants' economic integration.
- ⑤ Noncitizens are legally allowed to vote in U.S. federal elections if they have lived in the country for a sufficient period of time.



※ Questions 18 through 21 are based on the following passage.

[A] Why do some people seem endlessly curious, while others prefer the comfort of the familiar? We often think of curiosity as a stable personality trait, part of what makes each person unique. Yet recent evidence suggests it may be far more flexible and adaptive than we realize. A new study in *Evolutionary Behavioral Sciences* argues that curiosity evolves and (a) **fluctuates** with our environment. From an evolutionary perspective, curiosity is not just a drive to seek (b) **novelty**; it's a strategy shaped by the costs and benefits of exploration.

[B] For both humans and animals, curiosity serves an ancient function: it motivates information seeking. Exploring new places, learning how things work, or understanding others' behaviors all provide knowledge that can improve survival and reproduction. But exploration also involves risk. Searching for something new consumes time and energy and may expose one to failure or harm. Behavioral ecology predicts that exploration should therefore vary with environmental conditions. In secure, resource-rich contexts, the cost of failure is low while the long-term benefits of information are high. In contrast, in unpredictable or harsh environments, curiosity can be costly; the safest strategy is often to stick to what already works.

[C] A study tested this idea using data from 962 U.S. adults. Participants completed a comprehensive measure of curiosity, covering five (c) **dimensions**: joyous exploration, deprivation sensitivity, stress tolerance, social curiosity, and thrill-seeking. The researchers also measured participants' socioeconomic status (SES), both current and during childhood, as a (d) **proxy** for resource availability. The results were remarkably consistent: Higher current SES predicted higher curiosity across all five dimensions. People who felt more financially secure reported being more curious, more open to uncertainty, and more willing to take intellectual or social risks. Childhood SES, in contrast, showed little effect. This suggests that curiosity is not fixed early in life, but remains flexible, responding dynamically to current ecological conditions.

[D] The researchers interpret curiosity as a form of phenotypic plasticity, a behavioral flexibility that allows individuals to adjust to their environments. Rather than being a fixed trait, curiosity may act as (1) **a cognitive thermostat**, turning up when conditions are stable and safe, and turning down when uncertainty or (e) **scarcity** makes exploration costly. The same pattern appears across the animal kingdom. Primates, birds, and even bees explore more in safe, resource-rich settings. When energy reserves are high, the potential rewards of exploration outweigh the risks. Our curiosity expands when conditions allow for it and contracts when life demands caution.



18. (1.1 points) According to the passage above, why does behavioral ecology predict variations in exploratory behavior?

- ① Because the cognitive cost of curiosity differs across species
- ② Because social learning reduces the need for individual exploration
- ③ Because curiosity is genetically programmed to fluctuate over time
- ④ Because exploration increases reproductive success regardless of context
- ⑤ Because environmental conditions alter the balance between risk and reward

19. (1.1 points) What does the metaphor of (1) a cognitive thermostat in paragraph [D] primarily emphasize about curiosity?

- ① Curiosity can be understood as a form of behavioral adaptation.
- ② Curiosity operates automatically without conscious awareness of its effects.
- ③ Curiosity increases steadily as individuals accumulate knowledge and experience.
- ④ Curiosity is regulated by neurological mechanisms similar to temperature control.
- ⑤ Curiosity adjusts flexibly in response to environmental safety and resource conditions.

20. (1.1 points) Which of the following statements is most consistent with the logic of the passage above?

- ① Curiosity carries evolutionary costs that may outweigh its benefits in some contexts.
- ② Individuals in unpredictable environments benefit most from exploratory behavior.
- ③ Socioeconomic status determines curiosity in a deterministic manner.
- ④ High curiosity is advantageous only in childhood and adolescence.
- ⑤ Curiosity evolved because it maximizes survival outcomes.

21. (1.0 points) Which of the following pairs includes an expression that CANNOT replace the underlined expression in the passage above?

- ① (a) fluctuates, immerses
- ② (b) novelty, innovation
- ③ (c) dimensions, scopes
- ④ (d) proxy, substitution
- ⑤ (e) scarcity, insufficiency



※ Questions 22 through 25 are based on the following passage.

[A] “Get your eight hours.” It’s a command so familiar it feels timeless—an unquestioned truth that humans naturally need a full night’s sleep. Yet historical evidence suggests that even something as basic as sleep has been shaped by time, culture, and social organization. For much of recorded history, humans have actually slept eight hours, but in two distinct phases of approximately four hours each. As Roger Ekirch uncovered through a historical study of literature, art, and diaries, people would once head to bed when it got dark, sleep for four hours, wake for a while, and then slide into a “second sleep” for another four hours.

[B] This segmented form of sleep, however, began to fade as nighttime itself underwent a social transformation. As artificial lighting became more affordable, evenings were no longer defined by darkness and danger. By the 18th century, European cities had introduced public street lighting, making it safer and more acceptable to move about after dark. The night gradually shifted from a time associated with risk and rest to one increasingly open to social activity. In the United States, gas and later electric lighting further extended productive and social life into the evening, delaying bedtime and compressing the two sleep phases into a single stretch.

[C] It was industrialization that solidified the single sleep as a social norm. Especially in the cities that increasingly **(a) revolved** around factory production, a newly formalized workday structured daily life, and a fascination with productivity meant that spending hours lolling around in the middle of the night was considered **(b) slothful**. School schedules also became increasingly standardized, and as early as the 1820s, parenting books advised promptly **(c) weaning** children from the two-sleep pattern. By the late 19th century in the United States, school attendance was **(d) compulsory**, creating yet another cultural pressure to conform to this new sleeping schedule.

[D] Technological developments further reinforced this shift toward regulated, single-cycle sleep. Although clocks had existed since the ancient world, the invention of the mechanical alarm clock in the late 18th century marked a new relationship between sleep and labor. By the late 19th century, mass-produced alarm clocks were embraced by a society required to adjust its biological rhythms to the industrial clock. Sleep was no longer something that followed natural cycles but something that had to be regulated, timed, and optimized. The changing cultural meaning of sleep is also **(e) evident** in attitudes toward wakefulness. In earlier periods, being awake at night could be seen as useful or even virtuous. But by the late 19th century, insomnia, defined as the inability to sleep restfully through a single sleep cycle, had been categorized as a disorder, signaling the end of the era of the unproblematic segmented sleep.



22. (1.0 points) According to paragraph [B], which of the following is most accurate about artificial lighting?
- ① Artificial lighting is presented as a technological innovation that improved urban concentration.
 - ② Artificial lighting is presented as a cultural symbol of economic modernization.
 - ③ Artificial lighting is presented as a factor that altered the use of the nighttime.
 - ④ Artificial lighting is presented as an example of industrial efficiency applied to daily life.
 - ⑤ Artificial lighting is presented as a cause of declining physical health in urban populations.
23. (1.1 points) Which of the following best describes the primary function of paragraph [C] in the passage above?
- ① It challenges earlier claims about the impact of artificial lighting on nighttime behavior.
 - ② It explains technological developments that directly caused changes in sleep patterns.
 - ③ It shows how institutional and social norms consolidated single sleep as a standard.
 - ④ It emphasizes individual choice as the primary driver of sleep behavior.
 - ⑤ It describes a return to premodern biological rhythms of sleep.
24. (0.8 points) Which of the following pairs includes an expression that CANNOT replace the underlined expression in the passage above?
- ① (a) revolved, centered
 - ② (b) slothful, lazy
 - ③ (c) weaning, gradual separation
 - ④ (d) compulsory, optional
 - ⑤ (e) evident, apparent
25. (1.1 points) Which of the following questions is most directly addressed by the passage above?
- ① Why did biphasic sleep patterns prove less efficient than single-cycle sleep in industrial societies?
 - ② How did advances in sleep science overturn long-standing biological theories about human rest?
 - ③ To what extent can modern sleep disorders be attributed to artificial lighting and urbanization?
 - ④ Is uninterrupted eight-hour sleep biologically optimal for humans across all historical periods?
 - ⑤ How have historical, social, and technological changes shaped what is considered “normal” human sleep?



※ 문제 26 - 48

물음에 답하세요.

[26] [0.8점] 다음 중 $\cos^{-1}\left(\sin\left(\frac{2026}{7}\pi\right)\right)$ 를 간단히 한 것을 고르세요.

- ① $-\frac{13}{14}\pi$
- ② $-\frac{1}{14}\pi$
- ③ $\frac{1}{14}\pi$
- ④ $\frac{13}{14}\pi$
- ⑤ $\frac{15}{14}\pi$

[27] [1.0점] y 를 x 에 대한 함수라 할 때, 음함수 $x^2 - xy + y^2 = 4$ 가 점 $(x, y) = (2, 2)$ 를 지난다. 다음 중 옳은 것을 고르세요.

- ① $(2, 2)$ 에서 $\frac{dy}{dx} < 0$ 이고, 곡선은 아래로 볼록이다.
- ② $(2, 2)$ 에서 $\frac{dy}{dx} < 0$ 이고, 곡선은 위로 볼록이다.
- ③ $(2, 2)$ 에서 $\frac{dy}{dx} = 0$ 이고, 곡선은 아래로 볼록이다.
- ④ $(2, 2)$ 에서 $\frac{dy}{dx} = 0$ 이고, 곡선은 위로 볼록이다.
- ⑤ $(2, 2)$ 에서 $\frac{dy}{dx} > 0$ 이고, 곡선은 위로 볼록이다.

[28] [1.0점] $f(x) = x \ln x + 2x$ 로 정의된 함수 f 의 역함수를 f^{-1} 라 할 때, $(f^{-1})'(3e)$ 의 값을 구하세요.

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

[29] [0.8점] 모든 $x > 0$ 에 대해, <아래> 식을 만족하는 함수 f 에 따른 $f(a)$ 를 구하세요.

< 아래 >

$$6 + \int_a^x \frac{f(t)}{t^2} dt = 2\sqrt{x}$$

- ① 3
- ② 6
- ③ 9
- ④ 18
- ⑤ 27



[30] [1.0점] <보기>의 무한급수 내용들 중 옳은 것은 모두 몇 개입니까?

< 보기 >

가. $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n^2+n}}$ 은 조건부 수렴(conditionally convergent)한다.

나. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n^2+1}{2n^2+n}$ 은 조건부 수렴(conditionally convergent)한다.

다. $\sum_{n=1}^{\infty} \frac{n+\cos(n)}{\sqrt{n^3+n}}$ 은 발산(divergent)한다.

라. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{n} \sin\left(\frac{1}{\sqrt{n}}\right)$ 은 절대 수렴(absolutely convergent)한다.

- ① 0개 ② 1개 ③ 2개 ④ 3개 ⑤ 4개

[31] [1.0점] <아래> 함수에 대하여 $x = 3$ 에서의 미분계수 $f'(3)$ 의 값을 구하세요.

< 아래 >

$$f(x) = \arctan\left(\frac{1}{\sqrt{1+x}}\right)$$

- ① $-\frac{1}{20}$ ② $-\frac{1}{10}$ ③ 0 ④ $\frac{1}{10}$ ⑤ $\frac{1}{20}$

[32] [0.8점] <아래> 극한을 구하세요.

< 아래 >

$$\lim_{x \rightarrow 0} \frac{\sinh^2 x}{e^{2x} - 2\sin x - \cos x}$$

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



[33] [1.1점] <보기>에서 수렴하는 이상 적분(improper integral)은 모두 몇 개입니까?

< 보기 >

가. $\int_0^{\infty} e^{-(\ln x)^2} dx$	나. $\int_0^{\pi/2} \frac{x\sqrt{x}}{\sin^2 x} dx$
다. $\int_0^{2026} \frac{\cos x}{\sqrt{x}} dx$	라. $\int_0^{2026} e^x \sin x dx$

- ① 0개 ② 1개 ③ 2개 ④ 3개 ⑤ 4개

[34] [1.0점] $y = x - x^2$ 과 $y = 0$ 으로 유계된 영역을 직선 $x = 2$ 를 중심으로 회전시킬 때 생기는 입체의 부피를 구하세요.

- ① $\frac{1}{2}\pi$ ② $\frac{1}{6}\pi$ ③ $\frac{8}{3}\pi$ ④ π ⑤ $\frac{1}{4}\pi$

[35] [1.0점] 실수 t 에 대하여 $f(t) = 2[t] - \left[\frac{t}{\sqrt{2}}\right] + \left[\frac{t}{\sqrt{5}}\right]$ 라 하자. 여기서, $[t]$ 는 t 를 넘지 않는 가장 큰 정수를 의미한다. <아래> 식을 만족하는 유리수 a, b, c 에 대하여 $a + b + c$ 를 구하세요.

< 아래 >

$$\int_0^3 f(x) dx = a + b\sqrt{2} + c\sqrt{5}$$

- ① -3 ② -1 ③ 0 ④ 3 ⑤ 5

[36] [1.0점] 극한값 $\lim_{x \rightarrow 0} \frac{\ln(1+x) - P(x)}{x^6} = -\frac{1}{4}$ 을 만족하는 최소 차수의 다항식 $P(x)$ 에 대해 $P(1)$ 의 값을 구하세요.

- ① $\frac{13}{15}$ ② $\frac{21}{30}$ ③ $\frac{27}{30}$ ④ $\frac{37}{60}$ ⑤ $\frac{57}{60}$



[37] [1.1점] <아래> 극한을 구하세요.

< 아래 >

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{\sqrt{n+k}}{n^2} \sin\left(\frac{\pi k}{2n} + \frac{\sqrt{2\pi}}{\sqrt{n}}\right)$$

- ① 발산 ② π ③ $\frac{2}{\pi}$ ④ $\frac{4}{\pi}$ ⑤ $\frac{4}{\pi^2}$

[38] [1.1점] <아래> 이상 적분을 구하세요.

< 아래 >

$$\int_0^3 \frac{x}{\sqrt[3]{|x^2-1|}} dx$$

- ① $\frac{1}{2}$ ② $\frac{15}{4}$ ③ $\frac{2}{3}$ ④ 1 ⑤ 발산

[39] [1.0점] <아래> 적분을 구하세요.

< 아래 >

$$\int_0^2 \int_{y^2}^4 \frac{y}{x^2+1} dx dy$$

- ① $\frac{1}{4} \ln 17$ ② $\frac{1}{3} \ln 17$ ③ $\frac{1}{2} \ln 17$ ④ $\ln 17$ ⑤ 1

[40] [1.0점] 극좌표 방정식 $r = 1 + \cos \theta$ ($0 \leq \theta \leq 2\pi$)로 주어진 곡선의 길이를 구하세요.

- ① 0 ② 2 ③ 4 ④ 6 ⑤ 8



[41] [1.0점] 평면 상의 영역 $D = \{(x, y) : 0 \leq y \leq 2, y^2 \leq x \leq 2y\}$ 모양의 얇은 판(lamina)이 있다. 임의의 점에서 밀도가 x 축으로부터의 거리와 같다고 할 때, 이 얇은 판의 질량을 구하세요.

- ① $\frac{8}{3}$
- ② 4
- ③ $\frac{4}{3}$
- ④ $\frac{32}{15}$
- ⑤ 8

[42] [1.0점] 수열 $\{a_n\}$ 이 n 이 짝수이면 $a_n = (-1)^{n/2}$, n 이 홀수이면 $a_n = (-1)^{(n+1)/2}$ 으로 정의되었을 때, <아래> 무한급수의 합을 구하세요.

< 아래 >

$$\sum_{n=1}^{\infty} a_n \frac{\pi^n}{6^n n!}$$

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

[43] [1.0점] <아래> 적분을 구하세요.

< 아래 >

$$\int_{1/\sqrt{2}}^1 \int_{\sqrt{1-x^2}}^x x^3 y dy dx + \int_1^{\sqrt{2}} \int_0^x x^3 y dy dx + \int_{\sqrt{2}}^2 \int_0^{\sqrt{4-x^2}} x^3 y dy dx$$

- ① 2
- ② $\frac{31}{80}$
- ③ $\frac{93}{80}$
- ④ $\frac{21}{32}$
- ⑤ $\frac{63}{32}$

[44] [1.1점] <아래> 두 직선 l_1, l_2 사이의 최단거리를 구하세요.

< 아래 >

$$l_1: \quad x = \frac{y}{2} = \frac{z}{3} \qquad l_2: \quad x = y - 2 = z$$

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



[45] [1.0점] 곡선 $y = \frac{x^2}{4} - \frac{\ln x}{2}$ ($1 \leq x \leq 2$)를 y 축을 중심으로 회전시켜 얻은 회전곡면의 넓이를 구하세요.

- ① $\frac{5}{6}\pi$ ② $\frac{11}{6}\pi$ ③ $\frac{5}{3}\pi$ ④ $\frac{10}{3}\pi$ ⑤ $\frac{20}{3}\pi$

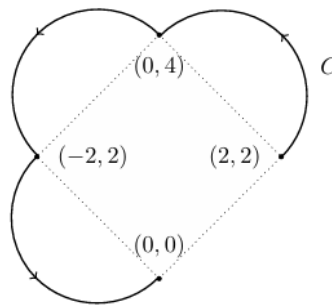
[46] [1.1점] 입체 E 는 구 $x^2 + y^2 + z^2 = 4$ 의 안쪽에 있고, 원뿔 $z = \sqrt{3(x^2 + y^2)}$ 의 아래쪽에 놓여 있다. <아래> 삼중적분을 구하세요.

< 아래 >

$$\iiint_E z \, dV$$

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

[47] [1.1점] xy -평면의 곡선 C 는 아래 그림과 같이 인접한 두 점 사이의 거리를 지름으로 하는 세 개의 반원으로 이루어져 있고, 방향은 그림과 같이 주어졌다. 선적분 $\int_C x \, dy$ 값을 구하세요.



- ① $3\pi + \frac{1}{2}$ ② 3π ③ $3\pi + 4$ ④ $3\pi + 8$ ⑤ $3\pi + 6$

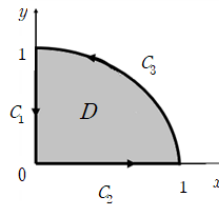


[48] [1.0점] 함수 $f(x, y) = x^3 - 3x + 3xy^2$ 는 (가) 개의 임계점을 가지며, 그 중 극대점은 (나) 개, 극소점은 (다) 개이고, 모든 안장점(saddle point)에서의 함수값의 합은 (라) 이다. (가), (나), (다), (라)의 합을 구하세요.

- ① 8 ② 6 ③ 4 ④ 3 ⑤ 2

※ 문제 49 - 50

그림과 같이, $C = C_1 \cup C_2 \cup C_3$ 는 닫힌 곡선으로서, C_1 과 C_2 는 각각 y 축과 x 축 위의 선분이 고, C_3 는 포물선 $x = 1 - y^2$ 의 호(arc)로 주어진다. 이 때, $0 \leq y \leq 1$ 이며, 곡선의 방향은 반시계방향이다.



[49] [1.0점] <아래> 선적분을 구하세요.

< 아래 >

$$\int_C (\sqrt{x+1} - \tan(x^3))dx + (xy - y^3)dy$$

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

[50] [1.0점] [49]번의 결과를 이용하여, <아래> 선적분을 구하세요.

< 아래 >

$$\int_{C_2 \cup C_3} (\sqrt{x+1} - \tan(x^3))dx + (xy - y^3)dy$$

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