

2014학년도 송실대학교 편입학 시험 문제



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2014학년도 숭실대학교 편입학 시험 문제(자연계)

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문항배점 : [1-10, 26-32] 1.5점 / [11-15, 33-43] 2점 / [16-25, 44-50] 2.5점

[1-2] Choose the one that is grammatically NOT correct.

(각 1.5점)

[1] People ① sign up through the Affordable Care Act's marketplaces tend to be older, officials said Monday, a demographic mix that ② could cause premiums ③ to rise in the future if the pattern ④ persists.

[2] Google, ① which dominates much of life on the Internet, has been trying to expand beyond computers and telephones to living rooms, cars and bodies. It made its way just a bit further into people's homes on Monday ② when it agreed to pay \$3.2 billion in cash for Nest Labs, ③ that makes Internet-connected devices ④ such as thermostats and smoke alarms.

[3-6] Choose the expression that is closest in meaning to the underlined part. (각 1.5점)

[3] Another human rights concern is the transnational crime of trafficking in humans.

- ① congestion ② illegal trade
③ over-population ④ transportation

[4] Be sure to do your homework. Keep track of names, faces, connections and important dates--people are flattered when you remember things about them.

- ① get angry ② feel betrayed
③ get frightened ④ feel pleased

[5] In the movie *Erin Brockovich*, Erin Brockovich (Julia Roberts) interviews families who live near a chemical dump and combs through city documents to build the case for a class-action lawsuit against PG&E.

- ① carefully investigates ② piles up
③ runs into ④ neatly trims

[6] In a sexual encounter, wolves become playful and frisky, "like puppies," said Dr. Givens, "so they can accept closeness." The next step is a mutual show of submission, all of which paves the way for physical intimacy.

- ① destroys ② necessitates
③ prepares for ④ totally blocks

[7-10] Choose the most appropriate word for each blank.

(각 1.5점)

[7] According to French social psychologist Gustave Le Bon, a crowd is _____ in thought and action. All the people in a crowd think, feel, and act alike.

- ① contradictory ② homogeneous ③ irrational ④ violent

[8] Chicago could see as much as 6-8 inches of snow from late Tuesday through late Thursday, which WGN _____ Tom Skilling says will arrive "in waves rather than a single stretch." (WGN: a television station in Chicago, Illinois, USA)

- ① astrologer ② astronomer ③ meteorologist ④ sportscaster

[9] In a company, the president earns five million dollars per year and the 99 assembly line workers earn only \$20,000 per year. The president might attempt to refute criticism of the company's _____ tactics by arguing that the mean annual income of these 100 people is \$69,800.

- ① arrogant ② generous ③ genuine ④ miserly

[10] Mrs. J then announced that we would be working independently, at our own pace, through the text for the duration of the course. "Don't be in a rush," she advised. "_____"; understand each exercise before you go on to the next. This isn't a race."

- ① Do it your way ② Do the right thing
③ Make up your mind ④ Take your time

[11-13] Read the following passage and answer the questions. (각 2점)

No one wants a sleepy pilot at the controls of a plane. While popping amphetamines might help with alertness, most passengers would probably just prefer the person at the helm to be well rested. But figuring out how to do this is a complicated business. Airlines want to preserve flexibility in their schedules, but everyone shares the goal of keeping passengers safe. Last week, new Federal Aviation Administration rules about pilot rest took effect in America. The rules, which airlines were warned about two years ago, require that pilots have 10 hours of rest, including eight hours of uninterrupted sleep, in between their eight- or nine-hour shifts. That's up from eight hours of rest before which didn't have to include uninterrupted sleep. The changes were prompted, in part, by the 2009 crash of Colgan Air Flight 3407. The National Transportation Safety Board's final report on the incident found pilot fatigue had probably contributed to the crash, which killed 50 people.

The big question, of course, is how to make sure pilots are actually getting the sleep that government regulators are mandating. The FAA, to its credit, says that pilots bear most of the burden for making sure they actually get some shut-eye. No one is going to be spying on pilots' hotel rooms. America's biggest pilots union is, no surprise, happy about the new rules, which will force airlines to hire more pilots and make sure that the ones that are flying are better-rested. (The union is, however, unhappy that the new guidelines don't apply to cargo pilots.) The new rules also require that pilots get 30 consecutive hours of rest each week, up from 24 hours under the previous regime. For pilots and their families, that will make a big difference. Let's hope the new rules make a difference for passenger safety, too.

[11] Who is NOT eligible for flying the passenger airplane?

- ① A pilot who rested 5 hours after flying for 5 hours on the previous shift.
② A pilot who rested 8 hours after flying for 8 hours on the previous shift.
③ A pilot who works part time for three days a week.
④ A pilot who took a two-day off from work last week and stayed at home.

[12] Who is most responsible for pilots' alertness?

- ① Federal Aviation Administration ② airplane companies
③ pilots ④ pilots union

[13] Which of the following is true about the aircraft safety?

- ① Pilot's failure to take enough rest might have contributed to the 2009 crash.
② Pilots should pass the red-eye test before their flight.
③ Pilots' spouses are not happy about the new rule.
④ The new rule will apply to all pilots of all aircraft types.

[14-16] Read the following passage and answer the questions. (14-15: 각 2점, 16: 2.5점)

An ambitious private manned mission to Mars aims to launch a two-person crew to fly around the Red Planet and return to Earth in 501 days, starting in January 2018. This bold undertaking is planned by the Inspiration Mars Foundation, a non-profit company founded by millionaire and space tourist Dennis Tito that was officially unveiled several months ago after early details leaked. Though the spacecraft would not land humans on Mars or even put them in orbit, it would bring people within a few hundred kilometers of the Martian surface roughly the same distance between the International Space Station and Earth and represent a major milestone in human space flight. If successful, the mission would go down in history as the first time a private company accomplished something government agencies were unable to do in space.

The mission is extremely ambitious, well beyond anything previously accomplished by the private sector and it faces plenty of obstacles. The company has an aggressive schedule to keep if it wants to hit its 2018 mark and needs to make sure the necessary technology is developed and well-tested. Despite its deep-pocketed backer, the mission has nowhere near the funding it needs to launch and will require raising greater sums than have ever been done for a private space endeavor. Its designers also need to figure out exactly how to keep the crew healthy, both physically and psychologically, for the 501-day duration of the flight as they face dangers from radiation, bone and muscle loss, fatigue, and depression. Mission designers will have to ensure they can get the crew safely to the ground when the capsule returns to Earth at a screaming 30,000 mph.

Yet (1) _____ these hurdles, of all the bold announcements from private space flight companies in recent years, this one seems the most achievable. "The reason this entire thing is possible is because it's actually a very simple mission," said Jane Poynter, president of the Paragon Space Development Corporation, "which makes life-support systems and has partnered with Inspiration Mars. We're not trying to land, we're going to fly by, and we're using extant technologies that NASA and the space industry have been developing for years."

[14] Which of the following best fits in (1)?

- ① along with ② despite ③ due to ④ concerning

[15] Who supports the manned mission to Mars?

- ① the US Government ② NASA
③ Dennis Tito ④ an anonymous astronaut

[16] Which of the following is NOT true about the mission to Mars?

- ① So far no one has landed on or flown near Mars.
② On the way home to Earth, the spacecraft would fly at 30,000 mph.
③ One round trip to Mars would take more than one year and four months.
④ Enough funding will enable humans to land on Mars in 2018.

[17-19] Read the following passage and answer the questions. (각 2.5점)

Indian women have now figured right on top in an infamous list--smoking. In a shocking trend, India has now more female smokers--over 12.1 million--than any country except the United States. In 2012, female smoking prevalence was 3.2%, which is virtually unchanged since 1980. Smokers in India consumed an average of 8.2 cigarettes per day as (1) tobacco claims a million lives every year in the country. Smoking has emerged as the third top risk for health loss in India.

Around three in 10 men (31%) and one in 20 women (6%) now smoke daily compared with four in 10 men (41%) and one in 10 women (10%) in 1980. These are the findings of the study 'Smoking Prevalence and Cigarette Consumption in 187 Countries, 1980-2012,' which was published lately in the *Journal of the American Medical Association*. India has been found to have made progress in reducing the prevalence of daily smoking among men, according to new research from the Institute for Health Metrics and Evaluation.

However, tobacco use (excluding second-hand smoke) led to 6.1% of years of life lost due to premature death, and 5.1% of health loss in India. "Smoking rates remain dangerously high for men and there is more work to be done to drive these rates lower," said Dr. K. Srinath Reddy, president of the Public Health Foundation of India, in response to the findings. Data released earlier had found that smoking is eight times more prevalent among Indian men than women. However, an average Indian female smoker puffs more cigarettes a day (7) than male (6.1). Over one in five (21%) Indian male tobacco users smoke daily as against only around 3% of women.

Nearly half of Indian men (47.9%) aged 15 years and above consume tobacco. Nearly 206 million Indians use smokeless form of tobacco (loose-leaf chewing tobacco and snuff). Smokeless tobacco use is high among Indian men at 32.9%. One in every five female tobacco users in India uses the smokeless form as against one in 10 who smoke. Also, an average Indian woman is taking up smoking at 17.5 years as against 18.8 years among men.

[17] Which of the following is closest in meaning to (1)?

- ① A million people do the tobacco-related business in India.
② A million Indians die every year due to tobacco-related diseases.
③ Most tobacco farms earn a million dollars per year in India.
④ Tobacco-smokers increase in India by a million every year.

[18] Which of the following is true about Indian smokers?

- ① Women smoke more cigarettes per day than men.
② Women start smoking later than men in their lives.
③ There are more female smokers than male smokers.
④ Female smokers have greatly increased in recent years.

[19] Which of the following is NOT true about smoking in India?

- ① Smoking is prevalent in India regardless of gender.
② The Indian government is trying to ban smoking in public places.
③ Loose-leaf chewing tobacco is popular among Indian men.
④ There are fewer female smokers in India than in the United States.

[20-22] Read the following passage and answer the questions. (각 2.5점)

The Englishmen who were quickly populating the Atlantic seaboard from the Carolinas to New England had no monopoly on the New World. French and Dutch explorers had also been busy, and both nations were carving out separate territories in North America. The Dutch founded New Netherlands in the Hudson Valley of present-day New York State, basing their claims upon the exploration of Henry Hudson in 1609.

An Englishman, Hudson was hired by a Dutch company that wanted to find the Northeast Passage, the sea route to China along the northern rim of Asia. In 1609, Hudson set off instead, aboard the *Half Moon*, for the northwest alternative. Sailing down the Atlantic coast, he entered Chesapeake Bay before making a U-turn and heading back north to explore the Hudson River as far upriver as Albany. Noting the absence of tides, he correctly assumed that this route did not lead to the Pacific.

England was flexing its new muscles in the early 1600s, but it was the Dutch who had become the true world power in

maritime matters by building the world's largest merchant marine fleet. There was literally not a place in the known world of that day in which the Dutch did not have a hand in matters. Amsterdam had become the busiest and richest city in the European world. In 1621, the Dutch West India Company was formed with the aim of taking over trade between Europe and the New World, and the Dutch soon took from the Portuguese control of the lucrative slave and sugar trading outpost in 1624. Two years later, the trading village of New Amsterdam, later to be renamed New York, was established at the mouth of the Hudson. The Dutch West India Company did more than trade and set up colonies. In 1628, the Dutch Admiral Piet Hein captured a Spanish treasure fleet, pirating away enough silver to provide company shareholders with a 75 percent dividend.

[20] Which of the following places has a different role in the early 1600s?
① Amsterdam ② Carolinas ③ New England ④ New York

[21] Which of the following is NOT true about Henry Hudson?
① The Dutch government hired him as a guide in the New World.
② His original mission was to find a sea route to Asia.
③ His upriver trip to Albany did not lead him to the Pacific.
④ His exploration helped the English claim their rights in New York.

[22] Which of following has little to do with the others?
① the growth in number of Englishmen
② the possession of the world's largest commercial ships
③ the takeover of the trading outposts from Portugal
④ the establishment of the Dutch West India Company

[23-25] Read the following passage and answer the questions. (각 2.5점)

If you noticed them at all, they'd look like nothing more than tiny, windblown seeds floating amid the rushes at the edge of a lagoon in Brazil's remote interior. Wait until dark, when the vast conspiratorial hush of the wetlands gives way to a chorus of chirpings and rustlings, and those little specks begin to slip away, vanishing in the murk.

These tiny dots are the watchful eyes of baby yacare caimans, members of the crocodilian family, barely two weeks old and scarcely longer than a pencil. By day they hide among aquatic grasses, concealed from herons or stocks who might swoop in for a quick snack. By night they slip away to feast on insects and snails, graduating to bigger fare as they grow bigger themselves. Given time and opportunity, they can reach eight feet and be powerful enough to capture a capybara, one of the area's giant rodents. But that's all in the future. For now they are near the bottom of the pecking order, just trying to (1) _____. Hundreds, possibly thousands, of these hatching caimans lurk in this one lagoon. And there are many more such lagoons in the Pantanal. This enormous flowering wetland along the Paraguay River in southwestern Brazil is not only home to what is probably Earth's largest crocodilian population but also the setting for one of conservation's great comeback stories.

Thirty years ago the yacare caiman appeared to be heading for oblivion, ruthlessly hunted to supply a lucrative market for crocodilian leather. Their numbers dropped alarmingly. Armed gangs would invade during the dry season and shoot masses of yacares congregated around shrinking water holes. A Brazilian government crackdown on poaching and a 1992 global ban on the trade of wild crocodilian skins eased the pressure on the beleaguered yacare population. The crocs themselves did the rest. After a string of intense rainy seasons caiman numbers rebounded dramatically. As many as ten million yacare caimans are estimated to live in the wetlands today. Even so, the yacare caiman is not yet out of the mire. Within the Pantanal itself,

threats still loom: deforestation, dams, tourism, mining, seaport development. But for now at least, in the steamy aftermath of another bountiful wet season, the kings of the Pantanal seem secure on their throne.

[23] Which of the following best fits in (1)?
① enjoy floating ② feed themselves
③ hatch the eggs ④ keep out of sight

[24] Which of the following is the greatest threat to yacare caimans?
① capybaras ② humans ③ tides ④ weather

[25] Which of the following does NOT contribute to the increasing number of yacare caimans?
① global ban on trade of crocodilian skins
② government effort to stop poaching
③ intense rainy seasons
④ pecking hierarchy

<수학문제는 뒷면에 계속됩니다.>

[26] 적분 $\int_0^1 \int_{\sqrt{3}x}^{\sqrt{4-x^2}} x^2 y \, dy \, dx$ 를 극좌표계의 적분으로 바르게 변환한 것은? (1.5점)

- ① $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \int_0^2 r^3 \sin \theta \cos^2 \theta \, dr \, d\theta$ ② $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \int_0^2 r^4 \sin \theta \cos^2 \theta \, dr \, d\theta$
 ③ $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_0^2 r^3 \sin \theta \cos^2 \theta \, dr \, d\theta$ ④ $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_0^2 r^4 \sin \theta \cos^2 \theta \, dr \, d\theta$

[27] 곡면 $z = x^2 + xy + 3y^2$ 위의 점 $(1, 1, 5)$ 에서의 접평면의 방정식은? (1.5점)

- ① $3x + 7y + z - 15 = 0$ ② $7x + 3y + z - 15 = 0$
 ③ $3x + 7y - z - 5 = 0$ ④ $7x + 3y - z - 5 = 0$

[28] 멱급수 $\sum_{n=1}^{\infty} (-1)^n \frac{3}{\sqrt{n}} (x-1)^n$ 의 수렴구간은? (1.5점)

- ① $(0, 2]$ ② $[0, 2]$ ③ $(-1, 1]$ ④ $[-1, 1]$

[29] 함수 $f(x) = \int_0^{x^2} e^t t^{2014} dt$ 의 $x = 1$ 에서의 미분계수 $f'(1)$ 의 값은? (1.5점)

- ① e ② $2e$ ③ $2015e$ ④ $4030e$

[30] $\sin\left(\tan^{-1}\left(-\frac{3}{4}\right)\right)$ 의 값은? (1.5점)

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

[31] 벡터 $\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4, \vec{v}_5$ 가 아래와 같을 때, 다음 중 벡터공간 $\mathbb{R}^3$ 의 일차독립인 집합은? (1.5점)

$$\vec{v}_1 = \begin{bmatrix} 0 \\ 0 \\ 3 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}, \vec{v}_3 = \begin{bmatrix} 0 \\ 1 \\ -2 \end{bmatrix}, \vec{v}_4 = \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, \vec{v}_5 = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

- ① $\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$ ② $\{\vec{v}_1, \vec{v}_2, \vec{v}_5\}$
 ③ $\{\vec{v}_2, \vec{v}_3, \vec{v}_4\}$ ④ $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4\}$

[32] 미분방정식 $y'' - 6y' + 9y = 0$ 의 일반해는? (단, c_1, c_2 는 상수이다.) (1.5점)

- ① $c_1 e^{3t} + c_2 e^{-3t}$ ② $c_1 e^{-3t} + c_2 t e^{-3t}$
 ③ $c_1 e^{3t} + c_2 t e^{3t}$ ④ $c_1 \cos(3t) + c_2 \sin(3t)$

[33] 반복적분 $\int_0^1 \int_{3y}^3 e^{x^2} dx \, dy$ 의 값은? (2점)

- ① $\frac{3(e^9 - 1)}{2}$ ② $\frac{e^9 - 1}{6}$ ③ $\frac{3(e^3 - 1)}{2}$ ④ $\frac{e^3 - 1}{6}$

[34] 함수 $f(x, y) = x^3 - 3x^2y - \frac{1}{2}y^2$ 에 대하여, 점 $(1, 1)$ 에서 방향도함수의 값이 0인 방향을 나타내는 벡터는? (2점)

- ① $\left\langle -\frac{4}{5}, \frac{3}{5} \right\rangle$ ② $\left\langle \frac{4}{5}, \frac{3}{5} \right\rangle$ ③ $\left\langle -\frac{3}{5}, \frac{4}{5} \right\rangle$ ④ $\left\langle \frac{3}{5}, \frac{4}{5} \right\rangle$

[35] 세 함수 $z = f(x, y)$, $x = g(s, t)$, $y = h(s, t)$ 가 다음을 만족할 때, $s = 1, t = 2$ 에서 $\frac{\partial z}{\partial t}$ 의 값은? (2점)

$g(1, 2) = 3,$	$h(1, 2) = 6,$	$g_s(1, 2) = -1,$	$g_t(1, 2) = 4,$
$h_s(1, 2) = -5,$	$h_t(1, 2) = 10,$	$f_x(3, 6) = 7,$	$f_y(3, 6) = 8$

- ① -54 ② -47 ③ 28 ④ 108

[36] 구간 $[0, \pi]$ 에서 극곡선 $f(\theta) = \sin \theta + 2\cos \theta$ 의 길이는? (2점)

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

[37] 다음 급수 중 수렴하는 것은? (2점)

- ① $\sum_{n=1}^{\infty} 3^{2n} 5^{1-n}$ ② $\sum_{n=1}^{\infty} (-1)^n \frac{n^2 - 7}{3n^2 + 3n}$
 ③ $\sum_{n=1}^{\infty} (-1)^n \frac{\ln(n^2)}{n}$ ④ $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{\sqrt{n}\sqrt{n^3}}$

[38] 적분 $\int_{\frac{1}{2}}^{\frac{\sqrt{3}}{2}} \frac{1}{\sqrt{1-x^2} \sin^{-1} x} dx$ 의 값은? (2점)

- ① $\frac{\pi}{6}$ ② $\frac{\pi}{3}$ ③ $\ln \frac{3}{2}$ ④ $\ln 2$

[39] 함수 $f(x)$ 가 연속이고 $\int_0^8 f(x)dx = 3$ 을 만족시킬 때, 적분

$\int_0^2 x^2 f(x^3)dx$ 의 값은? (2점)

- ① $\frac{1}{3}$ ② 1 ③ 3 ④ 9

[40] $f(x) = \begin{cases} x^2 \sin \frac{1}{x} & (x \neq 0) \\ 0 & (x = 0) \end{cases}$ 일 때, 적분 $\int_0^1 |f(x)|dx$ 에 가장

가까운 값은? (2점)

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

[41] 함수 $f(x) = e^x \cos \pi x$ 에 대하여, 극한 $\lim_{x \rightarrow 0} \frac{f(1+x) - f(1-x)}{x}$ 의

값은? (2점)

- ① $-2e$ ② $e - \pi$ ③ $2e$ ④ 2

[42] 함수 $f(x) = \sqrt{x^2 + 2x + 6}$ ($x > 0$)에 대하여, $(f^{-1})'(3)$ 의

값은? (2점)

- ① $-\frac{2}{3}$ ② $\frac{1}{3}$ ③ $\frac{\sqrt{21}}{4}$ ④ $\frac{3}{2}$

[43] 3×3 행렬 A 와 B 의 행렬식의 값이 $\det(A) = 8$ 과 $\det(B) = 5$ 일 때, $\det(2A^{-1}B^T)$ 의 값은? (단, B^T 는 B 의 전치행렬이다.) (2점)

- ① $\frac{1}{5}$ ② $\frac{5}{4}$ ③ 5 ④ 80

[44] 두 평면 $4x + 2y + 2z + 7 = 0$ 과 $2x - 3y + z - 4 = 0$ 의 교선과 수직이면서 점 $(-1, 2, 1)$ 을 지나는 평면의 방정식은? (2.5점)

- ① $x + 2z - 1 = 0$ ② $x - 2z + 3 = 0$
③ $x + y + 2z - 3 = 0$ ④ $x + y - 2z + 1 = 0$

[45] 다음 중 옳지 않은 것은? (2.5점)

- ① 두 수열 $\{a_n\}$ 과 $\{b_n\}$ 이 수렴하면, 수열 $\{a_{2n}b_{2n+1}\}$ 도 수렴한다.
② 수열 $\{(-1)^n a_n\}$ 이 수렴하면, 수열 $\{|a_n|\}$ 도 수렴한다.
③ $\sum_{n=1}^{\infty} a_n$ 과 $\sum_{n=1}^{\infty} b_n$ 이 수렴하면, $\sum_{n=1}^{\infty} a_n b_n$ 도 수렴한다.
④ $\sum_{n=1}^{\infty} |a_n|$ 이 수렴하면, $\sum_{n=1}^{\infty} (-1)^n a_n$ 도 수렴한다.

[46] 곡선 $y = \sqrt{x}$, 두 직선 $y = 0$ 과 $x = 4$ 로 둘러싸인 영역을 직선 $y = -1$ 을 축으로 회전시킨 회전체의 부피는? (2.5점)

- ① $\frac{34\pi}{3}$ ② $\frac{40\pi}{3}$ ③ $\frac{56\pi}{3}$ ④ $\frac{68\pi}{3}$

[47] $\cosh x = \frac{13}{5}$ ($x > 0$)일 때, 다음 중 옳은 것은? (2.5점)

- ① $e^x = 3$ ② $\sinh x = -\frac{12}{5}$
③ $\tanh x = \frac{13}{12}$ ④ $\cosh \frac{x}{2} = \frac{3}{\sqrt{5}}$

[48] 함수 $f(x) = |x|x^3$ 에 대한 설명으로 옳은 것은? (2.5점)

- ① 곡선 $y = f(x)$ 는 변곡점을 갖지 않는다.
② 일계도함수 $f'(x)$ 는 증가함수이다.
③ 이계도함수 $f''(x)$ 는 우함수이다.
④ 삼계도함수 $f'''(x)$ 는 연속함수이다.

[49] 미분가능한 함수 f 에 대하여, $f(1) = -3$ 이고 구간 $(1, 3)$ 의 모든 점 x 에서 $f'(x) \leq 5$ 일 때, 함수값 $f(3)$ 이 가질 수 있는 가장 큰 값은? (2.5점)

- ① 7 ② 12 ③ 13 ④ 17

[50] 초기치문제 $(x \cos y) \frac{dy}{dx} = \sin y$, $y\left(\frac{1}{2}\right) = \frac{\pi}{3}$ 의 해는? (2.5점)

- ① $y(x) = \sin^{-1}(\sqrt{3}x)$
② $y(x) = 2 \sin^{-1}x$
③ $y(x) = \sin^{-1}((2 + \sqrt{3})x - 1)$
④ $y(x) = \sin^{-1}x + \frac{\pi}{6}$

2014학년도 숭실대학교 편입학 시험 문제(자연계)

영 어, 수 학(B형)

지망학과(부) :

수험번호 :

성명 :

문항배점 : [1-10, 26-32] 1.5점 / [11-15, 33-43] 2점 / [16-25, 44-50] 2.5점

[1-2] Choose the one that is grammatically NOT correct. (각 1.5점)

[1] Google, ① which dominates much of life on the Internet, has been trying to expand beyond computers and telephones to living rooms, cars and bodies. It made its way just a bit further into people's homes on Monday ② when it agreed to pay \$3.2 billion in cash for Nest Labs, ③ that makes Internet-connected devices ④ such as thermostats and smoke alarms.

[2] People ① sign up through the Affordable Care Act's marketplaces tend to be older, officials said Monday, a demographic mix that ② could cause premiums ③ to rise in the future if the pattern ④ persists.

[3-6] Choose the most appropriate word for each blank. (각 1.5점)

[3] According to French social psychologist Gustave Le Bon, a crowd is _____ in thought and action. All the people in a crowd think, feel, and act alike.
① contradictory ② homogeneous ③ irrational ④ violent

[4] Chicago could see as much as 6-8 inches of snow from late Tuesday through late Thursday, which WGN _____ Tom Skilling says will arrive "in waves rather than a single stretch." (WGN: a television station in Chicago, Illinois, USA)
① astrologer ② astronomer ③ meteorologist ④ sportscaster

[5] In a company, the president earns five million dollars per year and the 99 assembly line workers earn only \$20,000 per year. The president might attempt to refute criticism of the company's _____ tactics by arguing that the mean annual income of these 100 people is \$69,800.
① arrogant ② generous ③ genuine ④ miserly

[6] Mrs. J then announced that we would be working independently, at our own pace, through the text for the duration of the course. "Don't be in a rush," she advised. "_____; understand each exercise before you go on to the next. This isn't a race."
① Do it your way ② Do the right thing
③ Make up your mind ④ Take your time

[7-10] Choose the expression that is closest in meaning to the underlined part. (각 1.5점)

[7] Another human rights concern is the transnational crime of trafficking in humans.
① congestion ② illegal trade ③ over-population ④ transportation

[8] Be sure to do your homework. Keep track of names, faces, connections and important dates--people are flattered when you remember things about them.
① get angry ② feel betrayed
③ get frightened ④ feel pleased

[9] In the movie *Erin Brockovich*, Erin Brockovich (Julia Roberts) interviews families who live near a chemical dump and combs through city documents to build the case for a class-action lawsuit against PG&E.
① carefully investigates ② piles up
③ runs into ④ neatly trims

[10] In a sexual encounter, wolves become playful and frisky, "like puppies," said Dr. Givens, "so they can accept closeness." The next step is a mutual show of submission, all of which paves the way for physical intimacy.
① destroys ② necessitates
③ prepares for ④ totally blocks

[11-13] Read the following passage and answer the questions. (각 2점)

No one wants a sleepy pilot at the controls of a plane. While popping amphetamines might help with alertness, most passengers would probably just prefer the person at the helm to be well rested. But figuring out how to do this is a complicated business. Airlines want to preserve flexibility in their schedules, but everyone shares the goal of keeping passengers safe. Last week, new Federal Aviation Administration rules about pilot rest took effect in America. The rules, which airlines were warned about two years ago, require that pilots have 10 hours of rest, including eight hours of uninterrupted sleep, in between their eight- or nine-hour shifts. That's up from eight hours of rest before which didn't have to include uninterrupted sleep. The changes were prompted, in part, by the 2009 crash of Colgan Air Flight 3407. The National Transportation Safety Board's final report on the incident found pilot fatigue had probably contributed to the crash, which killed 50 people.

The big question, of course, is how to make sure pilots are actually getting the sleep that government regulators are mandating. The FAA, to its credit, says that pilots bear most of the burden for making sure they actually get some shut-eye. No one is going to be spying on pilots' hotel rooms. America's biggest pilots union is, no surprise, happy about the new rules, which will force airlines to hire more pilots and make sure that the ones that are flying are better-rested. (The union is, however, unhappy that the new guidelines don't apply to cargo pilots.) The new rules also require that pilots get 30 consecutive hours of rest each week, up from 24 hours under the previous regime. For pilots and their families, that will make a big difference. Let's hope the new rules make a difference for passenger safety, too.

[11] Who is NOT eligible for flying the passenger airplane?
① A pilot who rested 5 hours after flying for 5 hours on the previous shift.
② A pilot who rested 8 hours after flying for 8 hours on the previous shift.
③ A pilot who works part time for three days a week.
④ A pilot who took a two-day off from work last week and stayed at home.

[12] Who is most responsible for pilots' alertness?
① Federal Aviation Administration ② airplane companies
③ pilots ④ pilots union

[13] Which of the following is true about the aircraft safety?
① Pilot's failure to take enough rest might have contributed to the 2009 crash.
② Pilots should pass the red-eye test before their flight.
③ Pilots' spouses are not happy about the new rule.
④ The new rule will apply to all pilots of all aircraft types.

[14-16] Read the following passage and answer the questions. (14-15: 각 2점, 16: 2.5점)

An ambitious private manned mission to Mars aims to launch a two-person crew to fly around the Red Planet and return to Earth in 501 days, starting in January 2018. This bold undertaking is planned by the Inspiration Mars Foundation, a non-profit company founded by millionaire and space tourist Dennis Tito that was officially unveiled several months ago after early details leaked. Though the spacecraft would not land humans on Mars or even put them in orbit, it would bring people within a few hundred kilometers of the Martian surface roughly the same distance between the International Space Station and Earth and represent a major milestone in human space flight. If successful, the mission would go down in history as the first time a private company accomplished something government agencies were unable to do in space.

The mission is extremely ambitious, well beyond anything previously accomplished by the private sector and it faces plenty of obstacles. The company has an aggressive schedule to keep if it wants to hit its 2018 mark and needs to make sure the necessary technology is developed and well-tested. Despite its deep-pocketed backer, the mission has nowhere near the funding it needs to launch and will require raising greater sums than have ever been done for a private space endeavor. Its designers also need to figure out exactly how to keep the crew healthy, both physically and psychologically, for the 501-day duration of the flight as they face dangers from radiation, bone and muscle loss, fatigue, and depression. Mission designers will have to ensure they can get the crew safely to the ground when the capsule returns to Earth at a screaming 30,000 mph.

Yet (1) _____ these hurdles, of all the bold announcements from private space flight companies in recent years, this one seems the most achievable. "The reason this entire thing is possible is because it's actually a very simple mission," said Jane Poynter, president of the Paragon Space Development Corporation, "which makes life-support systems and has partnered with Inspiration Mars. We're not trying to land, we're going to fly by, and we're using extant technologies that NASA and the space industry have been developing for years."

[14] Which of the following best fits in (1)?

- ① along with ② despite ③ due to ④ concerning

[15] Who supports the manned mission to Mars?

- ① the US Government ② NASA
③ Dennis Tito ④ an anonymous astronaut

[16] Which of the following is NOT true about the mission to Mars?

- ① So far no one has landed on or flown near Mars.
② On the way home to Earth, the spacecraft would fly at 30,000 mph.
③ One round trip to Mars would take more than one year and four months.
④ Enough funding will enable humans to land on Mars in 2018.

[17-19] Read the following passage and answer the questions. (각 2.5점)

The Englishmen who were quickly populating the Atlantic seaboard from the Carolinas to New England had no monopoly on the New World. French and Dutch explorers had also been busy, and both nations were carving out separate territories in North America. The Dutch founded New Netherlands in the Hudson Valley of present-day New York State, basing their claims upon the exploration of Henry Hudson in 1609.

An Englishman, Hudson was hired by a Dutch company that wanted to find the Northeast Passage, the sea route to China

along the northern rim of Asia. In 1609, Hudson set off instead, aboard the *Half Moon*, for the northwest alternative. Sailing down the Atlantic coast, he entered Chesapeake Bay before making a U-turn and heading back north to explore the Hudson River as far upriver as Albany. Noting the absence of tides, he correctly assumed that this route did not lead to the Pacific.

England was flexing its new muscles in the early 1600s, but it was the Dutch who had become the true world power in maritime matters by building the world's largest merchant marine fleet. There was literally not a place in the known world of that day in which the Dutch did not have a hand in matters. Amsterdam had become the busiest and richest city in the European world. In 1621, the Dutch West India Company was formed with the aim of taking over trade between Europe and the New World, and the Dutch soon took from the Portuguese control of the lucrative slave and sugar trading outpost in 1624. Two years later, the trading village of New Amsterdam, later to be renamed New York, was established at the mouth of the Hudson. The Dutch West India Company did more than trade and set up colonies. In 1628, the Dutch Admiral Piet Hein captured a Spanish treasure fleet, pirating away enough silver to provide company shareholders with a 75 percent dividend.

[17] Which of the following places has a different role in the early 1600s?

- ① Amsterdam ② Carolinas ③ New England ④ New York

[18] Which of the following is NOT true about Henry Hudson?

- ① The Dutch government hired him as a guide in the New World.
② His original mission was to find a sea route to Asia.
③ His upriver trip to Albany did not lead him to the Pacific.
④ His exploration helped the English claim their rights in New York.

[19] Which of following has little to do with the others?

- ① the growth in number of Englishmen
② the possession of the world's largest commercial ships
③ the takeover of the trading outposts from Portugal
④ the establishment of the Dutch West India Company

[20-22] Read the following passage and answer the questions. (각 2.5점)

If you noticed them at all, they'd look like nothing more than tiny, windblown seeds floating amid the rushes at the edge of a lagoon in Brazil's remote interior. Wait until dark, when the vast conspiratorial hush of the wetlands gives way to a chorus of chirpings and rustlings, and those little specks begin to slip away, vanishing in the murk.

These tiny dots are the watchful eyes of baby yacare caimans, members of the crocodilian family, barely two weeks old and scarcely longer than a pencil. By day they hide among aquatic grasses, concealed from herons or stocks who might swoop in for a quick snack. By night they slip away to feast on insects and snails, graduating to bigger fare as they grow bigger themselves. Given time and opportunity, they can reach eight feet and be powerful enough to capture a capybara, one of the area's giant rodents. But that's all in the future. For now they are near the bottom of the pecking order, just trying to (1) _____. Hundreds, possibly thousands, of these hatching caimans lurk in this one lagoon. And there are many more such lagoons in the Pantanal. This enormous flowering wetland along the Paraguay River in southwestern Brazil is not only home to what is probably Earth's largest crocodilian population but also the setting for one of conservation's great comeback stories.

Thirty years ago the yacare caiman appeared to be heading for oblivion, ruthlessly hunted to supply a lucrative market for crocodilian leather. Their numbers dropped alarmingly. Armed gangs would invade during the dry season and shoot masses of

yacares congregated around shrinking water holes. A Brazilian government crackdown on poaching and a 1992 global ban on the trade of wild crocodilian skins eased the pressure on the beleaguered yacare population. The crocs themselves did the rest. After a string of intense rainy seasons caiman numbers rebounded dramatically. As many as ten million yacare caimans are estimated to live in the wetlands today. Even so, the yacare caiman is not yet out of the mire. Within the Pantanal itself, threats still loom: deforestation, dams, tourism, mining, seaport development. But for now at least, in the steamy aftermath of another bountiful wet season, the kings of the Pantanal seem secure on their throne.

- [20] Which of the following best fits in (1)?
- ① enjoy floating ② feed themselves
 - ③ hatch the eggs ④ keep out of sight

- [21] Which of the following is the greatest threat to yacare caimans?
- ① capybaras ② humans ③ tides ④ weather

- [22] Which of the following does NOT contribute to the increasing number of yacare caimans?
- ① global ban on trade of crocodilian skins
 - ② government effort to stop poaching
 - ③ intense rainy seasons
 - ④ pecking hierarchy

[23-25] Read the following passage and answer the questions. (각 2.5점)

Indian women have now figured right on top in an infamous list--smoking. In a shocking trend, India has now more female smokers--over 12.1 million--than any country except the United States. In 2012, female smoking prevalence was 3.2%, which is virtually unchanged since 1980. Smokers in India consumed an average of 8.2 cigarettes per day as (1) tobacco claims a million lives every year in the country. Smoking has emerged as the third top risk for health loss in India.

Around three in 10 men (31%) and one in 20 women (6%) now smoke daily compared with four in 10 men (41%) and one in 10 women (10%) in 1980. These are the findings of the study 'Smoking Prevalence and Cigarette Consumption in 187 Countries, 1980-2012,' which was published lately in the *Journal of the American Medical Association*. India has been found to have made progress in reducing the prevalence of daily smoking among men, according to new research from the Institute for Health Metrics and Evaluation.

However, tobacco use (excluding second-hand smoke) led to 6.1% of years of life lost due to premature death, and 5.1% of health loss in India. "Smoking rates remain dangerously high for men and there is more work to be done to drive these rates lower," said Dr. K. Srinath Reddy, president of the Public Health Foundation of India, in response to the findings. Data released earlier had found that smoking is eight times more prevalent among Indian men than women. However, an average Indian female smoker puffs more cigarettes a day (7) than male (6.1). Over one in five (21%) Indian male tobacco users smoke daily as against only around 3% of women.

Nearly half of Indian men (47.9%) aged 15 years and above consume tobacco. Nearly 206 million Indians use smokeless form of tobacco (loose-leaf chewing tobacco and snuff). Smokeless tobacco use is high among Indian men at 32.9%. One in every five female tobacco users in India uses the smokeless form as against one in 10 who smoke. Also, an average Indian woman is taking up smoking at 17.5 years as against 18.8 years among men.

- [23] Which of the following is closest in meaning to (1)?
- ① A million people do the tobacco-related business in India.
 - ② A million Indians die every year due to tobacco-related diseases.
 - ③ Most tobacco farms earn a million dollars per year in India.
 - ④ Tobacco-smokers increase in India by a million every year.

- [24] Which of the following is true about Indian smokers?
- ① Women smoke more cigarettes per day than men.
 - ② Women start smoking later than men in their lives.
 - ③ There are more female smokers than male smokers.
 - ④ Female smokers have greatly increased in recent years.

- [25] Which of the following is NOT true about smoking in India?
- ① Smoking is prevalent in India regardless of gender.
 - ② The Indian government is trying to ban smoking in public places.
 - ③ Loose-leaf chewing tobacco is popular among Indian men.
 - ④ There are fewer female smokers in India than in the United States.

<수학문제는 뒷면에 계속됩니다.>

[26] $\sin\left(\tan^{-1}\left(-\frac{3}{4}\right)\right)$ 의 값은? (1.5점)

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

[27] 함수 $f(x) = \int_0^{x^2} e^t t^{2014} dt$ 의 $x = 1$ 에서의 미분계수 $f'(1)$ 의 값은? (1.5점)

- ① e ② $2e$ ③ $2015e$ ④ $4030e$

[28] 멱급수 $\sum_{n=1}^{\infty} (-1)^n \frac{3}{\sqrt{n}} (x-1)^n$ 의 수렴구간은? (1.5점)

- ① $(0, 2]$ ② $[0, 2]$ ③ $(-1, 1]$ ④ $[-1, 1]$

[29] 곡면 $z = x^2 + xy + 3y^2$ 위의 점 $(1, 1, 5)$ 에서의 접평면의 방정식은? (1.5점)

- ① $3x + 7y + z - 15 = 0$ ② $7x + 3y + z - 15 = 0$
③ $3x + 7y - z - 5 = 0$ ④ $7x + 3y - z - 5 = 0$

[30] 적분 $\int_0^1 \int_{\sqrt{3}x}^{\sqrt{4-x^2}} x^2 y \, dy \, dx$ 를 극좌표계의 적분으로 바르게 변환한 것은? (1.5점)

- ① $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \int_0^2 r^3 \sin\theta \cos^2\theta \, dr \, d\theta$ ② $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \int_0^2 r^4 \sin\theta \cos^2\theta \, dr \, d\theta$
③ $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_0^2 r^3 \sin\theta \cos^2\theta \, dr \, d\theta$ ④ $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_0^2 r^4 \sin\theta \cos^2\theta \, dr \, d\theta$

[31] 미분방정식 $y'' - 6y' + 9y = 0$ 의 일반해는? (단, c_1, c_2 는 상수이다.) (1.5점)

- ① $c_1 e^{3t} + c_2 e^{-3t}$ ② $c_1 e^{-3t} + c_2 t e^{-3t}$
③ $c_1 e^{3t} + c_2 t e^{3t}$ ④ $c_1 \cos(3t) + c_2 \sin(3t)$

[32] 벡터 $\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4, \vec{v}_5$ 가 아래와 같을 때, 다음 중 벡터공간 $\mathbb{R}^3$ 의 일차독립인 집합은? (1.5점)

$$\vec{v}_1 = \begin{bmatrix} 0 \\ 0 \\ 3 \end{bmatrix}, \vec{v}_2 = \begin{bmatrix} -1 \\ 0 \\ 1 \end{bmatrix}, \vec{v}_3 = \begin{bmatrix} 0 \\ 1 \\ -2 \end{bmatrix}, \vec{v}_4 = \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, \vec{v}_5 = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

- ① $\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$ ② $\{\vec{v}_1, \vec{v}_2, \vec{v}_5\}$
③ $\{\vec{v}_2, \vec{v}_3, \vec{v}_4\}$ ④ $\{\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4\}$

[33] 적분 $\int_{\frac{1}{2}}^{\frac{\sqrt{3}}{2}} \frac{1}{\sqrt{1-x^2} \sin^{-1} x} dx$ 의 값은? (2점)

- ① $\frac{\pi}{6}$ ② $\frac{\pi}{3}$ ③ $\ln \frac{3}{2}$ ④ $\ln 2$

[34] 다음 급수 중 수렴하는 것은? (2점)

- ① $\sum_{n=1}^{\infty} 3^{2n} 5^{1-n}$ ② $\sum_{n=1}^{\infty} (-1)^n \frac{n^2-7}{3n^2+3n}$
③ $\sum_{n=1}^{\infty} (-1)^n \frac{\ln(n^2)}{n}$ ④ $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{\sqrt{n} \sqrt{n^3}}$

[35] 구간 $[0, \pi]$ 에서 극곡선 $f(\theta) = \sin\theta + 2\cos\theta$ 의 길이는? (2점)

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

[36] 세 함수 $z = f(x, y)$, $x = g(s, t)$, $y = h(s, t)$ 가 다음을 만족할 때, $s = 1, t = 2$ 에서 $\frac{\partial z}{\partial t}$ 의 값은? (2점)

$g(1, 2) = 3,$ $h(1, 2) = 6,$ $g_s(1, 2) = -1,$ $g_t(1, 2) = 4,$ $h_s(1, 2) = -5,$ $h_t(1, 2) = 10,$ $f_x(3, 6) = 7,$ $f_y(3, 6) = 8$
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- ① -54 ② -47 ③ 28 ④ 108

[37] 함수 $f(x, y) = x^3 - 3x^2y - \frac{1}{2}y^2$ 에 대하여, 점 $(1, 1)$ 에서 방향도함수의 값이 0 인 방향을 나타내는 벡터는? (2점)

- ① $\left\langle -\frac{4}{5}, \frac{3}{5} \right\rangle$ ② $\left\langle \frac{4}{5}, \frac{3}{5} \right\rangle$ ③ $\left\langle -\frac{3}{5}, \frac{4}{5} \right\rangle$ ④ $\left\langle \frac{3}{5}, \frac{4}{5} \right\rangle$

[38] 반복적분 $\int_0^1 \int_{3y}^3 e^{x^2} dx \, dy$ 의 값은? (2점)

- ① $\frac{3(e^9-1)}{2}$ ② $\frac{e^9-1}{6}$ ③ $\frac{3(e^3-1)}{2}$ ④ $\frac{e^3-1}{6}$

[39] 3×3 행렬 A 와 B 의 행렬식의 값이 $\det(A)=8$ 과 $\det(B)=5$ 일 때, $\det(2A^{-1}B^T)$ 의 값은? (단, B^T 는 B 의 전치행렬이다.) (2점)

- ① $\frac{1}{5}$ ② $\frac{5}{4}$ ③ 5 ④ 80

[40] 함수 $f(x) = \sqrt{x^2 + 2x + 6}$ ($x > 0$) 에 대하여, $(f^{-1})'(3)$ 의 값은? (2점)

- ① $-\frac{2}{3}$ ② $\frac{1}{3}$ ③ $\frac{\sqrt{21}}{4}$ ④ $\frac{3}{2}$

[41] 함수 $f(x) = e^x \cos \pi x$ 에 대하여, 극한 $\lim_{x \rightarrow 0} \frac{f(1+x) - f(1-x)}{x}$ 의 값은? (2점)

- ① $-2e$ ② $e - \pi$ ③ $2e$ ④ 2

[42] $f(x) = \begin{cases} x^2 \sin \frac{1}{x} & (x \neq 0) \\ 0 & (x = 0) \end{cases}$ 일 때, 적분 $\int_0^1 |f(x)| dx$ 에 가장 가까운 값은? (2점)

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

[43] 함수 $f(x)$ 가 연속이고 $\int_0^8 f(x) dx = 3$ 을 만족시킬 때, 적분

$\int_0^2 x^2 f(x^3) dx$ 의 값은? (2점)

- ① $\frac{1}{3}$ ② 1 ③ 3 ④ 9

[44] 미분가능한 함수 f 에 대하여, $f(1) = -3$ 이고 구간 $(1, 3)$ 의 모든 점 x 에서 $f'(x) \leq 5$ 일 때, 함수값 $f(3)$ 이 가질 수 있는 가장 큰 값은? (2.5점)

- ① 7 ② 12 ③ 13 ④ 17

[45] 초기치문제 $(x \cos y) \frac{dy}{dx} = \sin y$, $y\left(\frac{1}{2}\right) = \frac{\pi}{3}$ 의 해는? (2.5점)

- ① $y(x) = \sin^{-1}(\sqrt{3}x)$
 ② $y(x) = 2 \sin^{-1}x$
 ③ $y(x) = \sin^{-1}((2 + \sqrt{3})x - 1)$
 ④ $y(x) = \sin^{-1}x + \frac{\pi}{6}$

[46] 곡선 $y = \sqrt{x}$, 두 직선 $y = 0$ 과 $x = 4$ 로 둘러싸인 영역을 직선 $y = -1$ 을 축으로 회전시킨 회전체의 부피는? (2.5점)

- ① $\frac{34\pi}{3}$ ② $\frac{40\pi}{3}$ ③ $\frac{56\pi}{3}$ ④ $\frac{68\pi}{3}$

[47] 함수 $f(x) = |x| x^3$ 에 대한 설명으로 옳은 것은? (2.5점)

- ① 곡선 $y = f(x)$ 는 변곡점을 갖지 않는다.
 ② 일계도함수 $f'(x)$ 는 증가함수이다.
 ③ 이계도함수 $f''(x)$ 는 우함수이다.
 ④ 삼계도함수 $f'''(x)$ 는 연속함수이다.

[48] $\cosh x = \frac{13}{5}$ ($x > 0$) 일 때, 다음 중 옳은 것은? (2.5점)

- ① $e^x = 3$ ② $\sinh x = -\frac{12}{5}$
 ③ $\tanh x = \frac{13}{12}$ ④ $\cosh \frac{x}{2} = \frac{3}{\sqrt{5}}$

[49] 두 평면 $4x + 2y + 2z + 7 = 0$ 과 $2x - 3y + z - 4 = 0$ 의 교선과 수직이면서 점 $(-1, 2, 1)$ 을 지나는 평면의 방정식은? (2.5점)

- ① $x + 2z - 1 = 0$ ② $x - 2z + 3 = 0$
 ③ $x + y + 2z - 3 = 0$ ④ $x + y - 2z + 1 = 0$

[50] 다음 중 옳지 않은 것은? (2.5점)

- ① 두 수열 $\{a_n\}$ 과 $\{b_n\}$ 이 수렴하면, 수열 $\{a_{2n} b_{2n+1}\}$ 도 수렴한다.
 ② 수열 $\{(-1)^n a_n\}$ 이 수렴하면, 수열 $\{|a_n|\}$ 도 수렴한다.
 ③ $\sum_{n=1}^{\infty} a_n$ 과 $\sum_{n=1}^{\infty} b_n$ 이 수렴하면, $\sum_{n=1}^{\infty} a_n b_n$ 도 수렴한다.
 ④ $\sum_{n=1}^{\infty} |a_n|$ 이 수렴하면, $\sum_{n=1}^{\infty} (-1)^n a_n$ 도 수렴한다.