## 고려대학교 세종캠퍼스 2018학년도 수시 학업능력고사(오후형)

### 영 어 영 역 (20 문항)

**1.** 다음 빈칸에 들어갈 말로 가장 적절한 것은?

Even in the days when America was known as the New World, it was a country with a reputation for its spirit of enterprise and the ability of its people to make a good deal. When the settlers started negotiating, the natives hardly knew what had hit them ― and in the summer of 1626, probably the most spectacular real estate coup in history took place. Governor Peter Minuit of the Dutch West India Company had the job of buying Manhattan Island from the Indians. After some haggling with Chief Manhasset, the price was agreed at 24 dollars' worth of kettles, axes and cloth. Today, $24 would not buy one square foot of office space in New York City, and an office block in central Manhattan changes hands for around $80 million. Even allowing for inflation, Minuit got himself a real _____.

① trick

② genius

③ bargain

④ respect

⑤ criticism

**2.** 다음 글의 목적으로 가장 적절한 것은?

The problem of sharing machinery is always a rostering one. Few farm machines (except possibly tractors) are multipurpose: they are designated to do specific tasks at specific points in the agricultural cycle. Given their limited period of usefulness, every farmer wants his own, so that he is not inconvenienced, nor his yields jeopardized, by having to queue for shared equipment. Every farmer wants his lands prepared before the rains begin; his planting started immediately after the rains; his herbicides applied immediately after germination; his crops sprayed as soon as pests are detected, and harvested at optimum moisture contents. He does not wish to forgo output by late ploughing, late planting, untimely pesticide application, or herbicides applied too late to prevent weeds from using nutrients intended for the crops.

＊roster 순번을 정하다

① 농기계 공유의 어려움의 이유를 설명하려고

② 농기계 공유에 대한 대책을 설명하려고

③ 농기계가 환경에 미치는 영향을 설명하려고

④ 농기계 공유의 장점과 단점을 설명하려고

⑤ 농기계 공유와 생산성과의 관계를 설명하려고

3. 다음 글에 드러난 'he'의 심경으로 가장 적절한 것은?

He slowly walked around the room, stroking every trophy, as if to say goodbye. He wondered if he could get as many trophies against the geniuses of his generation in the academic world as he had done in tennis. He slowly hauled his luggage down to his cars. The entire family were waiting to see him off. There was much kissing and hugging, followed by short encouraging words from his father. "Son, I won't wish you luck because you don't need it. You were born to be number one." Though he didn't show it, these parting words had the opposite of their intended effect. He wondered again if he could live up to their high expectations and if he could see their smiling faces again three months later. He stepped into his car, feeling something weighing heavily on his mind.

① impatient and regretful

② uneasy and pressured

③ annoyed and depressed

④ encouraged and satisfied

⑤ comforted and sympathetic

4. 다음 글의 빈칸 (A), (B)에 들어갈 말로 가장 적절한 것은?

The exact sequence of mistakes by which the Titanic came to collide with an iceberg has never been fully explained. It is known that during the 12 hours preceeding the disaster, messages were sent from other ships that large icebergs lay in the Titanic's path. However, these messages may not have reached the ship's bridge. When the collision occurred, the iceberg did not hit the Titanic head-on, but brushed the right side of the ship. ____(A)____, this was enough to buckle the hull and disconnect rivets below the waterline, creating leaks into five of the ship's hull compartments. Although lifeboats were deployed, there were not enough to hold everyone. Furthermore, some were launched before they were full. ____(B)____, about 1,500 people were still on the ship when it sank. Most are thought to have died of hypothermia in the ice-cold waters.

| | (A) | | (B) |
|---|---|---|---|
| ① | However | ······ | As a result |
| ② | However | ······ | By contrast |
| ③ | Therefore | ······ | As a result |
| ④ | Therefore | ······ | By contrast |
| ⑤ | Instead | ······ | In addition |

5. 밑줄 친 부분이 가리키는 대상이 나머지 넷과 <u>다른</u> 것은?

A Canadian man has made internet headlines by trading a paper clip for a house. Blogger Kyle Macdonald became bored with his work one day and had the idea of swapping a red paper clip on his desk for a house. ① <u>His</u> first trades were for very small objects — a pen, a door knob, later a neon sign — but step by step the 26-year-old built up to items of larger and larger value. His big breakthrough came when he swapped an afternoon with rock icon Alice Cooper for a snow globe. People who were following his trades thought ② <u>he</u> had made a big mistake by giving away something of such great value for a less desirable article, but as it turned out, a film director who collected snow globes wanted this one so much that ③ <u>he</u> offered the Canadian a part in a film. This swap gave the enterprising trader the opportunity ④ <u>he</u> needed for the final trade when a mayor of a small town offered ⑤ <u>him</u> an empty house in exchange for the film part. The whole process took one year and fourteen trades.

6. (A), (B), (C)의 각 네모 안에서 문맥에 맞는 낱말로 가장 적절한 것은?

Up to one hundred years ago, the boundaries of cultures were thought to be "fixed." One hundred years ago, when professional anthropology was in its earliest phase, field workers treated the cultures that they studied as if they were so isolated that their cultural boundaries were (A) impenetrable / loosened . Some selected islands for study because of their relative isolation. For example, Raymond Firth studied the island of Tikopia, treating it as an isolate with fixed boundaries, even though Tikopians did have some contact with the outside world. Cultures today do not exist within fixed boundaries; they (B) blend / crash into one another. At cultural boundaries, individuals are bilingual, frequently intermarry, and often join together in rituals. Since cultural boundaries are no longer fixed, changes are (C) constantly / rarely taking place in culture, often as a consequence of globalization. Because boundaries are fluid, individuals are active participants involved in reworking their cultures and their traditions in terms of influences from the outside.

|  | (A) | (B) | (C) |
|---|---|---|---|
| ① | impenetrable | crash | rarely |
| ② | loosened | blend | rarely |
| ③ | impenetrable | crash | constantly |
| ④ | loosened | blend | constantly |
| ⑤ | impenetrable | blend | constantly |

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7. 다음 글의 밑줄 친 부분 중, 어법상 틀린 것은?

A young lady was taking driving lessons from her father. The girl drove the family car around the backroads of the city, ① occasionally stopping and trying various approaches to parking. She attempted to drive through a rather long and narrow railroad underpass that ② had been built years earlier, so trains could get through town without stopping traffic. She entered the underpass and proceeded part way through, then suddenly she stopped. The path was narrow and the walls on both sides were so close that she focused all of her attention on missing them. The confusion caused by their ③ presence overwhelmed her, and she was unable to proceed. The girl tried to drive forward several times, but to no avail. Her teacher then suggested she ④ look ahead and focus on the end of the underpass where there was an opening. By creating a vision of where she was going and focusing on that vision, rather than focusing on the confusion of driving near the walls, she was able to proceed without difficulty. Visions of the future give the direction and focus needed to overcome the demands and confusion of the pathways ⑤ what lead to goals.

8. 다음 빈칸에 들어갈 말로 가장 적절한 것은?

The sight of others acting in a socially responsible manner ─ by dropping money in a Salvation Army bucket, for instance ─ can spur an observer to help in two ways. First, the observation of others' behavior is frequently the way that people, especially children, learn appropriate conduct. Exposing children to prosocial television programming, for example, teaches them to be more cooperative and generous. In addition to this teaching function, a prosocial model can also serve as a reminder, bringing the norm to consciousness in adults who may not have been thinking about helpfulness until they _____. In a classic study by James Bryan and Mary Ann Test, Los Angeles motorists were more likely to stop and help the driver of a disabled car if they'd witnessed another motorist doing so a quarter mile before.

① saw people donate money

② came across an instance of it

③ felt compelled to help others

④ passed by people in need of help

⑤ realized the values of good behavior

9. 다음 글의 요지로 가장 적절한 것은?

During the reign of Queen Victoria (1837-1901), life for the middle classes and aristocracy had never been better: the Industrial Revolution and the Empire provided them with undreamed-of luxury, convenience and wealth—but at the expense of the lower classes. Although slavery had been abolished in the British Empire in 1834, the working classes in the slums of Britain's industrial cities were treated almost as badly as slaves, and even young children were being forced to work long hours in factories and coal mines. During this period, over 10 million people escaped from these appalling conditions and emigrated to America and Australia. The magnificent Empire which brought vast profits to Britain's manufacturers exploited the people of the colonies, who produced cheap raw materials for British factories, and created nations of customers who came to depend on a supply of British products.

① 빅토리아 여왕 시대에 영국은 산업혁명으로 막강한 제국이 되었다.

② 영국은 빅토리아 여왕 시대에 가장 부강한 나라가 되었다.

③ 대영제국은 국내 산업을 위해 식민지 국가들을 착취하였다.

④ 번성했던 빅토리아 여왕 시대에도 어두운 이면이 있었다.

⑤ 빅토리아 여왕 시대에 계급의 차이가 극대화 되었다.

10. 다음 글의 주제로 가장 적절한 것은?

Medical discoveries attributed to animal use have often been made despite animal use and not because of it. Polio experiments involving monkeys, for instance, falsely indicated that the virus infected only the nervous system, and this mistake—directly related to reliance on animal "models"—delayed the discovery of the polio vaccine. Indeed, it was research with human cell cultures that led researchers to understand that the polio virus infected non-neural tissue and that the virus could be cultivated on non-neural tissue. Similarly, the use of a human's own veins to replace clogged arteries was delayed because animal experiments with dogs indicated that veins could not be used. These examples could be multiplied endlessly, and this supports considerable skepticism about the supposed benefits of animal experiments.

① dubious effects of animal experiments for medical development

② scientists' efforts to apply medical discoveries to humans

③ necessity to enact and enforce laws to protect animal rights

④ ethical problems of animal experiments for human benefit

⑤ relevance of animal experiments to human health

**11.** 다음 글에서 필자가 주장하는 바로 가장 적절한 것은?

I would like to introduce what I've come to call the lasagna principle — the notion that our capacity to enjoy different activities is limited and unique. Lasagna is my favorite food, and every time I visit my parents, my mother prepares a tray of it. This does not, however, mean that I want to eat lasagna all day and every day. The same principle applies to my favorite activities, such as writing and watching movies, as well as to my favorite people. The mere fact that my family is the most meaningful thing in my life does not mean that spending eight hours a day with them is what would make me happiest; and not wanting to spend all my waking hours with them does not imply that I love them any less. I derive a great deal of pleasure and meaning from being with other people, but I also need my daily quota of solitude. Identifying the right activity, and then the right quantity for each activity, leads to the highest quality of life.

① 매일 혼자 있는 시간도 어느 정도 필요하다.
② 선호하는 활동의 시간 조절이 필요하다.
③ 행복은 항상 우리 곁에 있다.
④ 가족과 함께 보내는 시간이 가장 행복하다.
⑤ 좋아하는 활동에 시간을 더 할애해야 한다.

**12.** 글의 흐름으로 보아, 주어진 문장이 들어가기에 가장 적절한 곳은?

During those sixty seconds of biological time, Modern Man has made a garbage dump of Paradise.

Planet Earth is 4,600 million years old. If we condense this inconceivable time-span into an understandable concept, we can liken Earth to a person of 46 years of age. Nothing is known about the first 7 years of this person's life, and whilst only scattered information exists about the middle span, we know that only at the age of 42 did the Earth begin to flower. ( ① ) Dinosaurs and the great reptiles did not appear until one year ago, when the planet was 45. ( ② ) Mammals arrived only 8 months ago; in the middle of last week manlike apes evolved into ape-like men, and at the weekend the last ice age enveloped the Earth. ( ③ ) Modern man has been around for 4 hours and during the last hour Man discovered agriculture. ( ④ ) The industrial revolution began a minute ago. ( ⑤ ) He has multiplied his numbers to plague proportions, caused the extinction of 500 species of animals, ransacked the planet for fuels and now stands like a brutish infant, gloating over this meteoric rise to ascendancy, on the brink of a war to end all wars and of effectively destroying this oasis of life in the solar system.

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13. 다음 글에서 전체 흐름과 관계 <u>없는</u> 문장은?

Why does language provide such a fascinating object of study? Perhaps because of its unique role in capturing the breadth of human thought and endeavor. ① We look around us, and are awed by the variety of several thousand languages and dialects, expressing a multiplicity of world views, literatures and ways of life. ② We look back at the thoughts of our predecessors, and find we can see only as far as language lets us see. ③ We look forward in time, and find we can plan only through language. ④ We look inside the Earth to study some of the most fundamental questions about matters in our universe. ⑤ We look outward in space, and send symbols of communication along with our spacecraft, to explain who we are, in case there is anyone there who wants to know.

14. 주어진 글 다음에 이어질 글의 순서로 가장 적절한 것은?

Marion Dawson, who attended that Wednesday afternoon lecture in Cambridge, would have found that hard to believe two years ago.

(A) Now, to her great delight, she can already express her own thoughts quite fluently in Chinese. She has ventured into other activities at the University of the Third Age and made new friends.

(B) But she wanted to keep in touch with her Chinese friends, to be able to read their letters without an interpreter. So she joined a Chinese class at the University of the Third Age.

(C) When her husband died in Hong Kong, where they had lived for some time, she felt she had lost everything. She came back to Cambridge and had to build a new life.

① (A) – (C) – (B)
② (B) – (A) – (C)
③ (B) – (C) – (A)
④ (C) – (A) – (B)
⑤ (C) – (B) – (A)

15. 다음 글의 내용을 한 문장으로 요약하고자 한다. 빈칸 (A), (B)에 들어갈 말로 가장 적절한 것은?

By the 1850s England was losing its predominance and beginning to be overtaken as an industrial economy, first by the United States and then by Germany. It is generally accepted that neither economics nor technology was the major reason. The main cause was social. Economically and financially, England remained the great power until World War I. Technologically it held its own throughout the nineteenth century. Synthetic dyestuffs, the first products of the modern chemical industry, were invented in England, and so was the steam turbine. But England did not accept the technologist socially. He never became a gentleman. The English built first-rate engineering schools in India but almost none at home. No other country so honored the scientist as Britain and, indeed, Britain retained leadership in physics throughout the nineteenth century. But the technologist remained a tradesman.

* synthetic dyestuffs 합성염료

↓

England, that had been ___(A)___ to none in industrial power until the 1850s, began experiencing a decline in power due to its strict norm of ___(B)___.

|  | (A) |  | (B) |
|---|---|---|---|
| ① | inferior | …… | social status |
| ② | related | …… | social manner |
| ③ | paralleled | …… | political principle |
| ④ | secondary | …… | economic equality |
| ⑤ | contributed | …… | educational background |

[16~17] 다음 글을 읽고, 물음에 답하시오.

John is one of my assistant coaches at the University of New York, someone who played for me at Providence College and who is going to make a fine head coach some day. He is someone who will do everything I ask him to do, and he will do it with dedication, competence, and commitment. If I tell him to make fifteen phone calls he will make all fifteen, no matter how late he has to stay at work to do so. But he won't make the sixteenth. He won't make that extra step, and that's what I'm now trying to get him to do. To take what I tell him and move on from there with his own ideas and his own creativity. To be willing to take that next step, rather than merely be content with doing what's expected of you.

And he's now taking that extra step, forming his own identity. He's traveled the road from ex-player to assistant coach to future head coach. We were about to lose Ron Mercer, a prized recruit, to Tennessee. Ron had heard all the recruiting pitches about as much as one could tolerate. John convinced me to try it one more time. So I did, going to Oak Hill Academy in the foothills of Virginia, where I went to the blackboard in a classroom and pointed out in minute detail why the University of New York was best suited for his future. Ron signed with us shortly after. John's insistence that we _____ was the turning point to our attracting the top high school player in the country.

16. 윗글의 제목으로 가장 적절한 것은?

① Make Your Future Plan
② Trust Your Own Intuition
③ Go Beyond the Current Track
④ Develop Your Potential Talent
⑤ Respect Other People's Advice

17. 윗글의 빈칸에 들어갈 말로 가장 적절한 것은?

① go after it one more time
② know what we wanted most
③ show what we did in the past
④ think twice before making the decision
⑤ help him get along with other players

(A)

Many centuries ago, an African king sent his son to the temple to study under one of the tribe's great spiritual leaders. Because the prince was to succeed his father as king, the wise old sage was charged with teaching the boy the basics of success, abundance, and prosperity. When the prince arrived at the temple gates, the master sent (a) him alone deep into the forest surrounding the village.

(B)

The young warrior was puzzled by the old man's request. Had (b) he not discerned every sound already? For days and nights on end, the boy sat motionless in the woods unable to detect any other sounds. Then one morning, as he sat silently beneath the sun, the prince began to discern faint sounds unlike those he had ever heard before. The more acutely he listened, the clearer the noises became. A feeling of enlightenment enveloped (c) his being. He reflected, "These must be the sounds the master wished me to discern."

(C)

When the prince returned to the temple, the old man asked what (d) he had heard. "Master," he responded, "when I listened more closely, I could hear the unheard — the sounds of the flowers opening, the sound of the sun warming the earth, and the sound of the grass drinking the morning dew."

The wise old man nodded in agreement. "To hear the unheard," he remarked, "is a necessary discipline for achievement. For only when an individual has learned to listen closely with his or her inner ear, to spiritually discern and translate all that is being said or communicated, will he or she be able to uncover the ancient secrets to success, prosperity, and happiness."

(D)

After several months of introspection, the prince returned to the temple to describe all that he had heard. "What did you hear, my son?" the old man asked. "Master," the prince replied energetically, "I could hear the birds chirping, the owls hooting, the leaves rustling, the bees buzzing, and the whistling of the wind." When the young boy had finished, his teacher was visibly upset. Not receiving the answer that (e) he wanted, he instructed the prince to visit the forest again. "Go back," he urged, "and this time, listen more intently — to all the sounds within the forest."

18. 주어진 글 (A)에 이어질 내용을 순서에 맞게 배열한 것으로 가장 적절한 것은?

① (B) – (C) – (D)

② (C) – (B) – (D)

③ (C) – (D) – (B)

④ (D) – (B) – (C)

⑤ (D) – (C) – (B)

19. 밑줄 친 (a)~(e) 중에서 가리키는 대상이
    나머지 넷과 <u>다른</u> 것은?

    ① (a)

    ② (b)

    ③ (c)

    ④ (d)

    ⑤ (e)

20. 윗글의 내용으로 적절하지 <u>않은</u> 것은?

    ① 왕은 교육을 위해 왕자를 부족의 영적 지
      도자에게 보냈다.

    ② 왕자는 숲으로 돌아오자마자 들리지 않던
      소리를 듣게 되었다.

    ③ 스승은 왕자의 두 번째 답변으로 깨달음
      을 얻은 것을 알았다.

    ④ 스승은 모든 소리를 알아내도록 왕자를
      숲속으로 보냈다.

    ⑤ 숲으로 되돌아가라는 스승의 지시에 왕자
      는 어리둥절했다.

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1. $(1+a) + (1+a)^2 + (1+a)^3 + \cdots + (1+a)^6$의 전개식에서 $a^3$의 계수는?

① 6    ② 18    ③ 21    ④ 35    ⑤ 42

2. 집합 $A = \{1, 2, 3, 4, 5, 6\}$을 원소의 개수가 서로 다른 두 개의 집합으로 분할하는 방법의 수는?

① 9    ② 15    ③ 21    ④ 27    ⑤ 33

3. 두 양수 $a, b$가 다음 조건을 만족시킨다.

(가) $\dfrac{\log_2 b - 2}{\log_2 a} = -1$

(나) $\log_2 \dfrac{b^2}{a^2 + 1} + \log_2 \dfrac{a^2}{b^2 + 1} = -1$

$a^3 - b^3$의 값은? (단, $a > b$ 이다.)

① $7\sqrt{7}$      ② $11\sqrt{7}$

③ $15\sqrt{7}$      ④ $19\sqrt{7}$

⑤ $23\sqrt{7}$

4. 전체집합 $U$의 세 부분집합 $P, Q, R$이 각각 세 조건 $p, q, r$의 진리집합이라 하자. $P - Q = \phi$, $(P \cup Q) \cap R = \phi$, $Q \cup R = U$가 성립할 때, <보기>에서 옳은 것만을 있는 대로 고른 것은?

──── <보 기> ────

ㄱ. $p \rightarrow q$    ㄴ. $\sim p \rightarrow r$    ㄷ. $\sim r \rightarrow p$

① ㄱ            ② ㄱ, ㄴ

③ ㄱ, ㄷ       ④ ㄴ, ㄷ

⑤ ㄱ, ㄴ, ㄷ

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5. 두 수열 $\{a_n\}$, $\{b_n\}$에 대하여 급수 $\sum\limits_{n=1}^{\infty}(a_n+b_n)$ 이 수렴한다고 할 때, <보기>에서 옳은 것만을 있는 대로 고른 것은?

━━━━━ <보 기> ━━━━━

ㄱ. $\lim\limits_{n\to\infty}a_n = 0$이면 $\lim\limits_{n\to\infty}b_n = 0$이다.

ㄴ. 급수 $\sum\limits_{n=1}^{\infty}a_n$이 수렴하면 급수 $\sum\limits_{n=1}^{\infty}b_n$도 수렴한다.

ㄷ. 급수 $\sum\limits_{n=1}^{\infty}\dfrac{a_n+b_n}{a_{n+1}+b_{n+1}}$ 는 수렴한다.

① ㄱ　　　　　　　② ㄴ
③ ㄱ, ㄴ　　　　　④ ㄱ, ㄷ
⑤ ㄱ, ㄴ, ㄷ

6. 유리함수 $y = \dfrac{-2x+4}{x-1}$의 그래프와 무리함수 $y = \sqrt{x+k} + \dfrac{1}{2}$의 역함수의 그래프가 서로 다른 두 점에서 만나도록 하는 $k$의 최솟값은?

① $-6$　② $-4$　③ $0$　　④ $4$　　⑤ $6$

7. 서로 독립인 두 사건 $A, B$에 대하여 $\mathrm{P}(A \cap B) = \dfrac{1}{3}$, $\mathrm{P}(A \cap B^C) = \dfrac{1}{6}$일 때, $\mathrm{P}(A^C \cap B)$의 값은? (단, $A^C$은 $A$의 여사건 이다.)

① $\dfrac{1}{6}$　② $\dfrac{1}{3}$　③ $\dfrac{1}{2}$　④ $\dfrac{2}{3}$　⑤ $\dfrac{5}{6}$

8. 실험실의 실내온도 $28℃$를 유지하기 위한 시간 당 전력소비량을 $W$라 하자. 실내온도를 $1℃$ 내릴 때마다 그 온도를 유지하기 위한 시간당 전력소비량은 일정한 비율로 증가한다. 실내온도를 $25℃$로 유지하기 위한 시간당 전력소비량은 $1.23W$일 때, 시간당 전력소비량이 $2W$가 되는 온도는? (단, $\log 1.23 = 0.09$, $\log 2 = 0.30$으로 계산한다.)
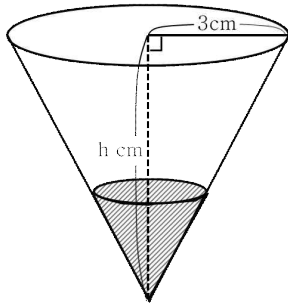
① $10℃$ ② $12℃$ ③ $14℃$ ④ $16℃$ ⑤ $18℃$

9. $f(x) = x^3 - 3x^2 + 8$위의 점 $(1, 6)$에서의 접선이 점 $(a, 0)$을 지날 때, 상수 $a$의 값은?

① 3    ② 4    ③ 5    ④ 6    ⑤ 7

10. 두 실수 $a$, $b$에 대하여

$$f(x) = \lim_{n \to \infty} \frac{a|x| + b|x|^n + 2}{|x|^n + 1}$$ 가 모든 실수 $x$에 대하여 연속함수일 때, $b - a$의 값은?

① $-2$    ② $-1$    ③ 0    ④ 1    ⑤ 2

11. 수열 $\{a_n\}$에 대하여 $S_n = \sum_{k=1}^{n} a_k$라 하자. 수열 $\{S_{2n}\}$은 공차가 $d$인 등차수열이고, 수열 $\{S_{2n-1}\}$은 공차가 $-2$인 등차수열이다. $a_2 = 2$이고 $a_{10} = 22$일 때, $d$의 값은?

① 1    ② 2    ③ 3    ④ 4    ⑤ 5

12. 그림과 같이 밑변의 반지름의 길이가 $3cm$이고 높이가 $h\,cm$인 원뿔 모양의 빈 그릇이 있다. 이 그릇에 매초 $1cm$ 속도로 수면의 높이가 상승하도록 물을 채우려고 한다. 물을 넣기 시작한 지 3초가 되는 순간, 그릇에 담긴 물의 부피의 변화율이 $\pi(cm^3/초)$일 때, $h$의 값은?



① 8　② 9　③ 10　④ 11　⑤ 12

13. 함수 $f(x) = \displaystyle\int_{2}^{x}(3t^2 - 6t - 9)dt$는 극댓값 $a$와 극솟값 $b$를 갖는다. $a-b$의 값은?

① 12　② 17　③ 22　④ 27　⑤ 32

14. 다항함수 $f(x)$가 모든 실수 $x, y$에 대하여
$$f(x+y) = f(x) + f(y) + 4xy - 2$$
를 만족시킨다. $\displaystyle\lim_{x\to 2}\frac{f(x) - f'(x)}{x-2} = 20$일 때, $f'(0)$의 값은?

① 2　② 16　③ 30　④ 44　⑤ 58

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15. 다음은 함수 $f(x) = \dfrac{|x-1|}{x}$의 $x = 1$에서의 연속성과 미분가능성을 조사하는 과정이다.

> (i) $\displaystyle\lim_{x \to 1} f(x) = \boxed{(\text{가})}$ 이고, $f(1) = 0$이므로
>
> 　함수 $f(x)$는 $x = 1$에서 $\boxed{(\text{나})}$
>
> (ii) $\displaystyle\lim_{x \to 1^+} \dfrac{f(x) - f(1)}{x - 1} = \boxed{(\text{다})}$이고
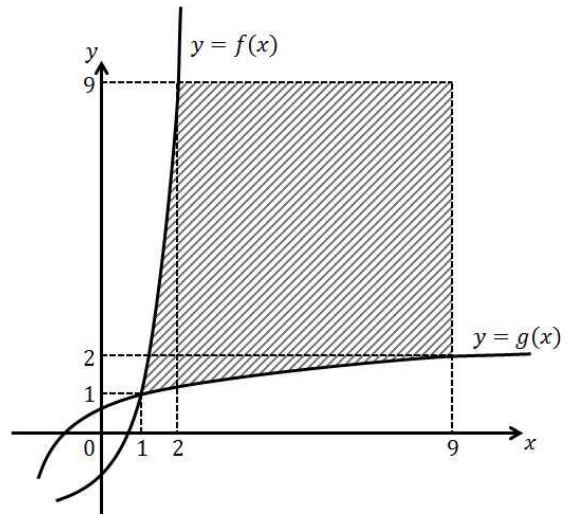>
> 　$\displaystyle\lim_{x \to 1^-} \dfrac{f(x) - f(1)}{x - 1} = \boxed{(\text{라})}$
>
> 이므로 함수 $f(x)$는 $x = 1$에서 $\boxed{(\text{마})}$

위의 과정에서 (가), (나), (다), (라), (마)에 알맞은 것은?

① 0, 연속이다, 0, 0, 미분가능하다
② 0, 연속이다, 1, $-1$, 미분가능하지 않다
③ 0, 불연속이다, 1, 1, 미분가능하다
④ 1, 불연속이다, 0, 0, 미분가능하다
⑤ 1, 불연속이다, 1, $-1$, 미분가능하지 않다

16. 함수 $f(x) = x^3 + x - 1$의 역함수를 $g(x)$라 할 때, 두 곡선 $y = f(x)$, $y = g(x)$와 두 직선 $x = 9$, $y = 9$로 둘러싸인 부분의 넓이는?



① $\dfrac{109}{2}$ ② $\dfrac{221}{4}$ ③ $56$ ④ $\dfrac{113}{2}$ ⑤ $\dfrac{229}{4}$

17. 세 명의 학생이 각각 영화 $A, B, C, D, E$ 중 임의로 한 영화를 선택하여 관람하기로 하였다. 세 명의 학생 중 한 명만 다른 영화를 관람하게 될 확률은?

① $\dfrac{6}{25}$  ② $\dfrac{8}{25}$  ③ $\dfrac{2}{5}$  ④ $\dfrac{12}{25}$  ⑤ $\dfrac{1}{2}$

18. 확률변수 $X$가 이항분포 $\mathrm{B}\left(4, \dfrac{1}{2}\right)$을 따를 때, $\mathrm{E}\left((X-1)^2\right)$의 값은?

① $0$  ② $1$  ③ $2$  ④ $3$  ⑤ $4$

19. 모평균이 $m$, 모표준편차가 $\sigma$인 정규분포를 따르는 모집단에서 크기가 $n$인 표본을 임의추출하여 얻은 표본평균을 $\overline{X}$라 하자. 확률변수 $\overline{X}$의 확률밀도함수를 $f(x)$라 할 때, <보기>에서 옳은 것만을 있는 대로 고른 것은?

─── <보 기> ───

ㄱ. $x = m$일 때, $f(x)$는 최댓값 $\dfrac{1}{\sqrt{2\pi}\,\sigma}$을 갖는다.

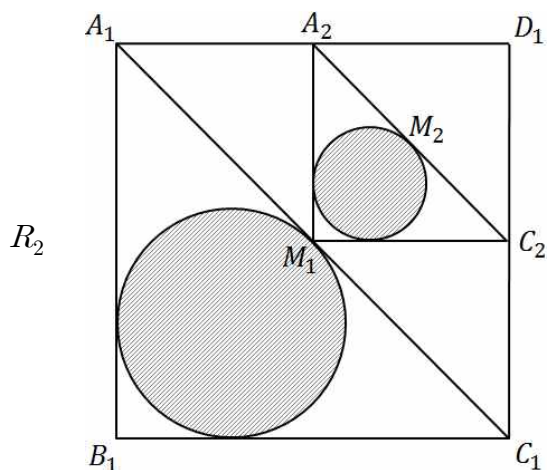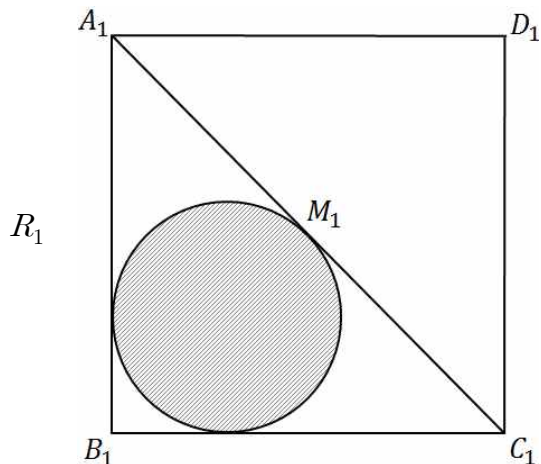ㄴ. 함수 $f(x)$의 그래프는 $x = m$에 대하여 대칭이고, 함수의 그래프와 $x$축으로 둘러싸인 부분의 넓이는 1이다.

ㄷ. $m$과 $n$의 값이 일정할 때, $\sigma$의 값이 작아지면 함수 $f(x)$의 그래프는 중앙 부분이 높아진다.

① ㄱ   ② ㄴ
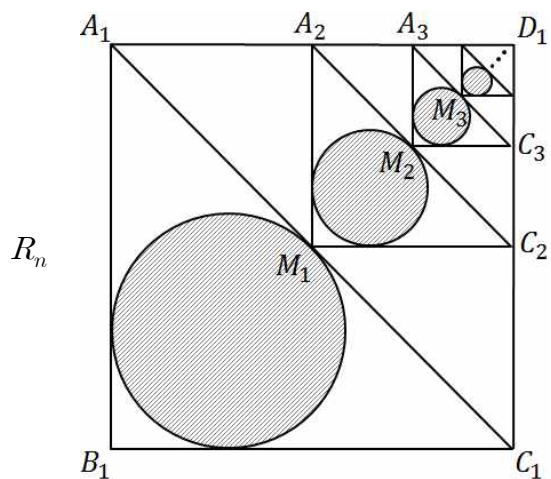③ ㄱ, ㄷ   ④ ㄴ, ㄷ
⑤ ㄱ, ㄴ, ㄷ

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20. 그림과 같이 한 변의 길이가 2인 정사각형 $A_1B_1C_1D_1$에서 대각선 $A_1C_1$을 한 변으로 하는 삼각형 $\triangle A_1B_1C_1$에 내접하는 원을 그리고, 원의 내부에 색칠하여 얻은 그림을 $R_1$이라 하자.

그림 $R_1$에서 선분 $A_1C_1$ 위의 중점 $M_1$과 선분 $A_1D_1$ 위의 점 $A_2$ 및 선분 $C_1D_1$ 위의 점 $C_2$를 잡아 정사각형 $A_2M_1C_2D_1$을 그리고, 정사각형 $A_2M_1C_2D_1$에서 그림 $R_1$을 얻은 것과 같은 방법으로 만들어지는 원의 내부에 색칠하여 얻은 그림을 $R_2$라 하자.

이와 같은 과정을 계속하여 $n$번째 얻은 그림 $R_n$에서 색칠되어 있는 부분의 넓이를 $S_n$이라 할 때, $\lim\limits_{n\to\infty} S_n$의 값은?







① $\dfrac{3(3-2\sqrt{2})\pi}{2}$

② $\dfrac{8(3-2\sqrt{2})\pi}{3}$

③ $2$

④ $\dfrac{3(3-\sqrt{2})\pi}{2}$

⑤ $\dfrac{8(3-\sqrt{2})\pi}{3}$

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