

2023年度

## 武南高等学校入試問題

【数 学】（50分）〈満点：100点〉

【注意】・コンパス，定規，分度器，電卓等の計算器は使用しないこと。

・分数や無理数は，下の例のように簡単にして答えること。

 $\frac{1}{2}$ …正解， $\frac{2}{4}$ …不正解とみなす $2\sqrt{2}$ …正解， $1\sqrt{8}$ …不正解とみなす

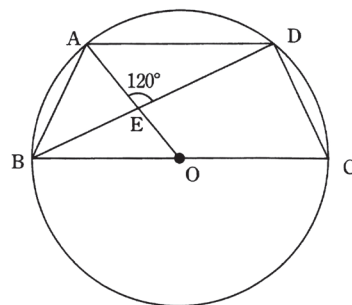
1 次の問いに答えよ。

(1)  $12a^4b^3 \div 3a^2b \times 2a = \boxed{\text{ア}} a^{\boxed{\text{イ}}} b^{\boxed{\text{ウ}}}$

(2)  $x=3+\sqrt{5}$ ， $y=3-\sqrt{5}$ のとき，  
 $xy = \boxed{\text{エ}}$ であり， $x^2+2xy+y^2 = \boxed{\text{オカ}}$ である。

(3)  $\sqrt{216n}$ が3桁の自然数となるような最小の整数 $n$ の値を求めると  
 $n = \boxed{\text{キク}}$ である。

(4)  $3x^2y-18xy-21y = \boxed{\text{ケ}} y(x^2 - \boxed{\text{コ}} x - \boxed{\text{サ}})$   
 $= \boxed{\text{ケ}} y(x + \boxed{\text{シ}})(x - \boxed{\text{ス}})$

2 旅行のお土産で1個500円の品物Aと1個700円の品物Bを合わせて50個買うことにした。送料は，品物50個をまとめて1600円かかる。品物代と送料の合計金額をちょうど30000円にするとき，品物Bを $\boxed{\text{セソ}}$ 個買えばよい。3 右図のように点Oを中心とする円にAD//BCである台形ABCDが内接している。また，直線AOと直線BDの交点をEとする。 $\angle AED = 120^\circ$ とすると，以下の問いに答えよ。

(1)  $\angle ADB = \boxed{\text{タチ}}^\circ$ である。

(2)  $\angle ABC = \boxed{\text{ツテ}}^\circ$ である。

4 大小2つのさいころを同時に投げるとき，以下の問いに答えよ。また，さいころはどの目が出ることも同様に確からしいものとする。

(1) 同じ目が出る確率は $\frac{\boxed{\text{ト}}}{\boxed{\text{ナ}}}$ である。

(2) 出る目の和が6になる確率は $\frac{\boxed{\text{ニ}}}{\boxed{\text{ヌネ}}}$ である。

(3) 出る目の和が12の約数になる確率は $\frac{\boxed{\text{ノ}}}{\boxed{\text{ハ}}}$ である。

 $\boxed{\text{ヒ}} \sim \boxed{\text{ホ}}$ は使用しません。

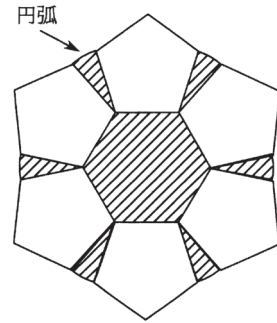
- 5 1辺の長さが2の正六角形の各辺を1辺とする正五角形がある。  
図の円弧は、正六角形の各頂点を中心とする半径2の扇形の弧である。斜線部分の面積は、

$$\boxed{\text{ア}}\sqrt{\boxed{\text{イ}}} + \frac{\boxed{\text{ウ}}}{\boxed{\text{エ}}}\pi \text{である。}$$

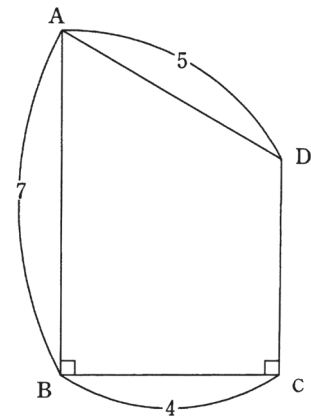
また、いちばん外側の周の長さは、

$$\boxed{\text{オカ}} + \frac{\boxed{\text{キ}}}{\boxed{\text{ク}}}\pi \text{である。}$$

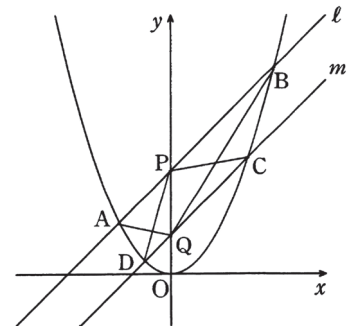
ただし、 $\pi$ は円周率とする。



- 6 右図の四角形ABCDを辺CDを軸に1回転させてできる立体の体積は $\boxed{\text{ケコ}}\pi$ であり、表面積は $\boxed{\text{サシ}}\pi$ である。  
ただし、 $\pi$ は円周率とする。



- 7 右図のように、関数 $y = \frac{1}{2}x^2$ のグラフに2直線 $\ell: y = x + 4$ ,  $m: y = x + \frac{3}{2}$ が4点A, B, C, Dで交わっている。  
P, Qは $\ell$ ,  $m$ のそれぞれのy切片である。  
2点A, Bの座標はそれぞれ  
A( $\boxed{\text{スセ}}$ ,  $\boxed{\text{ソ}}$ ), B( $\boxed{\text{タ}}$ ,  $\boxed{\text{チ}}$ )  
であり、線分AB, CDの長さは、それぞれ  
 $\boxed{\text{ツ}}\sqrt{\boxed{\text{テ}}}$ ,  $\boxed{\text{ト}}\sqrt{\boxed{\text{ナ}}}$ である。



よって、 $\triangle PCD$ の面積をSとすると、

$\triangle QAB$ の面積は $\frac{\boxed{\text{ニ}}}{\boxed{\text{ヌ}}}S$ である。また、点Pから直線 $m$ に下した

垂線の長さは $\frac{\boxed{\text{ネ}}\sqrt{\boxed{\text{ノ}}}}{\boxed{\text{ハ}}}$ であるから、

四角形ABCDの面積は $\frac{\boxed{\text{ヒフ}}}{\boxed{\text{ヘ}}}$ となる。

$\boxed{\text{ホ}}$ は使用しません。

8 みなみさんとたけしさんが、先生から出された問題について教室で話し合っている。□□□の  
中に適当な数を入れよ。

みなみ：先生から2, 5, 8, 11, 14, 17, …という数列

(注)数を一列に並べたもの)の始めから100番目までたすといくつになるか考えてみたら  
と言われたよ。

たけし：とりあえず2から17までたすと「アイ」だけど、100番目までは大変だよ。

みなみ：この数列、前に先生から習った数列の規則性と同じだよ。

たけし：そうか、2から順に「ウ」ずつ増える数列だ。

みなみ：そうだね。このように規則的に並んだ数列なら、きっといい方法があるよ。

たけし：なかなか思いつかないなあ。先生にヒントを聞いてみよう。

先生：この数列、2から17までを逆に並べて考えてみて。

たけし：2, 5, 8, 11, 14, 17を17, 14, 11, 8, 5, 2と並べてみると…

みなみ：あっ、1番目どうし、2番目どうし、…6番目どうしをそれぞれたすと、みんな「エオ」  
になるよ。

たけし：ということは、それを6個たせば「カキク」になるね。

みなみ：この値は同じ数字を2回ずつたしているから、2で割って「ケコ」になる。始めにたし算  
した値と等しくなったね。

たけし：いま逆に並べてたしたらみんな等しくなったということは、その値は、数列の最初と最  
後の数をたした値と等しいことになるね。

みなみ：だから、このような規則性の数列は、最初の数と最後の数をたして、並んでいる数字の  
数をかけて2で割ればいいんだよ。

たけし：じゃあ、この数列の100番目までの和を出してみよう。

以前、先生から習ったことを使うとこの数列の $n$ 番目は $3n-1$ となるから、100番目は  
「サシス」になるね。

みなみ：ということは、 $(2 + \text{サシス}) \times 100 \div 2$ で和は「セソタチツ」になるね。

たけし：このやり方で1から100までの自然数の和も、きっと簡単に出来るよ。

みなみ：計算してみると…「テトナニ」だね。じゃあ、考えたことをいっしょに先生へ報告に行こ  
う！

「又」～「ホ」は使用しません。

【英 語】（50分）〈満点：100点〉

**I** 試験開始からおよそ3分後に放送が始まります。放送される英文をよく聴いて、あとの1)～5)の質問に対する答えとして最も適切なものを、それぞれ下の①～④の中から1つずつ選び、番号をマークしなさい。なお、英文とそれに対する質問文はそれぞれ2回ずつ読まれます。

1)

- ① Himself alone.
- ② With his son.
- ③ With his daughter.
- ④ With his wife, sons and daughter.

2)

- ① He is very rich.
- ② He is always angry.
- ③ He loves his son.
- ④ He cannot forget his wife.

3)

- ① 10 dollars
- ② 20 dollars
- ③ 30 dollars
- ④ 50 dollars

4)

- ① Because he was very tired from his job.
- ② Because Dave was not old enough to make money.
- ③ Because he didn't want to give his son the ten dollars.
- ④ Because he was too drunk.

5)

- ① Because he thought he had to save money for a living.
- ② Because he wanted another treasure box.
- ③ Because he knew Ted wouldn't play with him without money.
- ④ Because he wanted his father to play with him even for an hour.

＜リスニングテスト放送台本＞

**I**

Ted had a son, but his son had no mother. Ted and his seven-year-old son, Dave, lived alone. Ted was not very rich, so he had to work hard every day.

One evening, Ted was driving home after a hard day at work. He was very tired, but he loved his son.

“Dave must be feeling lonely now. I have to get home as soon as possible.” He hurried home, but he didn't get back home until nine o'clock. Dave was still awake when he saw his father, and

said, "Dad, how much do you make an hour?"

Ted got angry at his son. He felt like he was not making enough money for them to live on, and he was too tired to stay calm.

"Why do you ask such a silly question when I come home from a hard day at work? I make twenty dollars an hour. Is that good enough for you?"

"I'm sorry, Dad, but... will you give me ten dollars?"

"Another silly question! Just go to bed and sleep! Right now!"

After Dave went to his room, Ted sat down on his sofa and had a drink. He came to himself again, and thought he was wrong to be angry at his son. He went into Dave's room.

"I'm sorry, son. I didn't want to get angry with you. Here's your ten dollars."

"Thank you, Dad!"

Dave got up and opened his treasure box. He had another ten dollars in it. When Ted saw this, he got angry again.

"Why do you want another ten dollars? You already have ten dollars!"

But Dave asked, watching his Dad's eyes, "Dad, can I buy one hour of your time with these twenty dollars?"

- 1) Who does Ted live with?
- 2) What kind of a man is Ted?
- 3) How much does Dave's father make an hour?
- 4) Why did Ted get angry with Dave?
- 5) Why did Dave want the ten dollars?

## Ⅱ 次の英文を読んで、あとの問いに答えなさい。

After Mozart's death, Beethoven studied under Haydn, but Haydn did not like him. Beethoven came from a poor home. His father drank until the end of his life and was now dead. His mother was dead too. (あ) He had little money of his own. But Vienna was a rich place, and its people were not like Beethoven. (い) When they spoke gently, he did not. When they took off their hats to great men in the streets, Beethoven kept his hat on his head.

He was never afraid of showing his feelings. Once when he was playing at a rich man's house, one of the listeners, a man of good family, was talking to the girl. He likes girls more than music, and he did not stop when Beethoven started to play the piano. (う) The voice was not a quiet one, and Beethoven could hear well in those days.

The music stopped in the middle and Beethoven stood up, (え) "I do not play for animals of this kind!" he cried. "No! Not for animals!" Then he walked out.

To make money, he had to teach, and in the great houses he taught numbers of young ladies who wished to play the piano; but of course they were often careless because music was not important to them. When they played badly, their teacher did not hide (お) the truth. He told them openly that they were playing badly, that they must never hope to play well, and that he was

wasting his time. Sometimes he took the music from the hand of the poor girls, pulled it to pieces, threw the pieces on the floor, and jumped on them. Then he walked out of the house, and came back only when he wanted to come. (か) Their wishes were nothing to him.

Even in those days the world knew that he was a great man, but he was also a strange man. Once he paid for a dinner which he did not order and did not eat. It was (き) to tell him not to pay : he paid. Sometimes, when he went out to dinner, he thought that his place at the table was too low. Then he grew very angry and said that he did not want to be thought a servant. Why was he not a gentler and quieter man?

He was sick. In early life he did not always have enough to eat and he was not as strong as other men. Often at his father's house he needed a doctor; (く) but a visit to a doctor in those days cost money, and he did not go. He had other troubles.

He began to lose his hearing. In 1796 he began to notice it. (け) he could not hear much. When he was fifty, he could hear nothing at all. But he never gave up music. (こ) His whole life was given to music : there was nothing else in it.

6) 下線部(あ)が表す内容として最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。

- ① 彼が持っていた少しのお金は自分のものだった。
- ② 彼は自分のお金をほとんど持っていなかった。
- ③ 彼にはお金が少しあった。
- ④ 彼は自分のお金を全てなくしてしまった。

7) 下線部(い)について Beethoven がこのような態度をとった理由としてふさわしいものを下の選択肢から1つ選び、番号をマークしなさい。

- ① Beethovenにとってウィーンの人々が彼に親切すぎたから。
- ② Beethovenはウィーンの人々とは生きる環境が違うと感じたから。
- ③ Beethovenは家族がおらず、貧しいから。
- ④ Beethovenはウィーンの人々に興味がなかったから。

8) 下線部(う)が指す内容として最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。

- ① Beethovenの演奏に感動する人の声
- ② Beethovenの怒鳴り声
- ③ 裕福な家柄の男性と若い女性のしゃべり声
- ④ 女性好きの裕福な男性が若い女性に話しかける声

9) 下線部(え)の animals が指す内容として最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。

- ① a rich man
- ② the listeners
- ③ a man of good family and a girl
- ④ a man of good family

- 10) 下線部(お)が指す内容として本文の内容に合っていないものを下の選択肢から1つ選び、番号をマークしなさい。
- ① 若い女性達は自分達にとって音楽が重要だと考えていること
  - ② 若い女性達は注意散漫で、演奏が下手だということ
  - ③ 若い女性達は熱心に練習しないので、上達の見込みがないこと
  - ④ 若い女性達に音楽を教えることは時間の無駄なこと
- 11) 下線部(か)が指す内容として最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。
- ① that number of young ladies wanted to play the piano
  - ② that number of young ladies wanted to know the truth
  - ③ that number of young ladies wanted Beethoven to teach
  - ④ that number of young ladies wanted Beethoven to come back to the great house
- 12) 空所(き)に当てはまる最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。
- ① necessary
  - ② useful
  - ③ strange
  - ④ impossible
- 13) 下線部(く)が指す内容として最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。
- ① Doctors needed a lot of money in those days.
  - ② Doctors wanted to make more money in those days.
  - ③ It was too expensive to see a doctor in those days.
  - ④ Beethoven had to borrow money to see a doctor in those days.
- 14) 空所(け)に入る語句として不適当なものを下の選択肢から1つ選び、番号をマークしなさい。
- ① When he was forty,
  - ② When he was forty years old,
  - ③ At the year of forty
  - ④ At the age of forty
- 15) 下線部(こ)が指す内容として最も適当なものを下の選択肢から1つ選び、番号をマークしなさい。
- ① Beethoven の生活全体が音楽に結びついていた。
  - ② Beethoven の生活全体が音楽で表現された。
  - ③ Beethoven は聴力を回復させるために命を捧げた。
  - ④ Beethoven は生活全てを音楽に捧げた。

- Ⅲ 次の英文を読んで、空所16)～20)に最もよく当てはまるものを、それぞれ下の①～④の中から1つずつ選び、番号をマークしなさい。

Do you like English? Many students will say yes. But some students may say that it is difficult to learn English words. Have you ever asked ( 16 ) how some English words were born? Let's look at the history of two English words.

It is interesting to see how the word “kangaroo” came into English. A kangaroo is an animal living in Australia. When Captain Cook and his friends came to Australia in 1770, they found kangaroos. They asked the natives in Australia, “What do you call this animal?” The natives answered, “Kangaroo.” When they saw other natives in Australia later, they ( 17 ) what “kangaroo” really meant in their language. It meant “I don't know.” But the word “kangaroo” is still used as the name for that animal.

You may not think that “school” first meant “free time.” But it ( 18 ). Many years ago some young men in Greece used their free time for studying. Soon the place for learning was called “school” in Greece. It still is. That is the history of the English word “school.”

Every word has its own history. Some words are ( 19 ), and other words are new. If you study more about the history of English words, you'll learn a lot of new and interesting things about them and may find that learning English words is ( 20 ) than before.

- |               |              |              |             |
|---------------|--------------|--------------|-------------|
| 16) ① myself  | ② yourself   | ③ himself    | ④ itself    |
| 17) ① put off | ② heard from | ③ looked for | ④ found out |
| 18) ① was     | ② did        | ③ had        | ④ thought   |
| 19) ① simple  | ② difficult  | ③ old        | ④ clear     |
| 20) ① easier  | ② harder     | ③ longer     | ④ shorter   |

- Ⅳ 次の英文の空所21)～25)に最もよく当てはまるものを、それぞれ下の①～④の中から1つずつ選び、番号をマークしなさい。

- 21) Tom bought ( ) for his new home yesterday.  
 ① furniture    ② furnitures    ③ a furniture    ④ some furnitures
- 22) Do you think the rain will stop soon? — No, I'm afraid ( ).  
 ① none    ② so    ③ not    ④ it
- 23) Koji is a singer ( ) songs are loved by young people.  
 ① who    ② that    ③ whom    ④ whose
- 24) I'll send the document to you by email as soon as ( ).  
 ① can    ② early    ③ possible    ④ fast
- 25) My mother is worried ( ) my health.  
 ① about    ② in    ③ with    ④ by



V 次のAさんとBさんの対話文を読んで、空所26)～30)に最もよく当てはまるものを、それぞれ下の①～④の中から1つずつ選び、番号をマークしなさい。

- 26) A: Is it true that you recently got a dog?  
B: Yes, that's right. It's so cute.  
A: (        )  
B: I'm fine with that. Anything with a dog is fun.  
① How much does your dog bite?  
② What kind of dog do you have?  
③ Do you think it's fun to take care of a dog?  
④ It is hard to walk your dog, isn't it?
- 27) A: Hey Mike, how are you doing?  
B: (        )  
A: Why are you in such a happy mood?  
B: Because Shohei Otani won the MVP! You know what I mean?  
① Couldn't be better!  
② He won that game!  
③ I don't think so.  
④ Not bad.
- 28) A: Hey Tom, how about going bowling next month?  
B: (        )  
A: Jerry wants to go with us.  
B: Really? I'll manage to shift the schedule.  
① Let me think about that.  
② It's too bad she couldn't come.  
③ I'm not available next Monday.  
④ I can make it. I don't have any plans.
- 29) A: Welcome to the site.  
B: (        )  
A: Yes, Just as you like.  
B: This blue bag is lovely.  
① Do you accept credit cards?  
② How much is this bag?  
③ Can I pick it up?  
④ Could you show me a different size?

30) A: What a big bag!

B: ( )

A: It's fine. You're taking out the trash?

B: No, I'm moving out tomorrow.

- ① It weighs about 10 kg.
- ② Would you mind giving me a hand?
- ③ Could you take it to the post office?
- ④ It's my moving package.

**VI** 次の日本文に合うように、下の①～⑦の語(句)を用いて文を完成させる場合に空所31)～40)に最もよく当てはまるものを、それぞれ下の①～⑦の中から1つずつ選び、番号をマークしなさい。ただし、文頭に來るべき語も小文字で始めてあります。

31), 32) 彼女は私の気持ちを理解できるたった1人の女の子でした。

She ( )( )( 31 )( )( )( 32 )( ).

- ① my feelings      ② could      ③ was      ④ understand
- ⑤ the only      ⑥ that      ⑦ girl

33), 34) 彼女は冬の間、食堂を暖かくしておいた。

( )( )( 33 )( )( )( 34 )( ).

- ① the      ② she      ③ warm      ④ dining
- ⑤ kept      ⑥ room      ⑦ in winter

35), 36) 日本人が英語の間違いをするのは当然ですよ。

( )( )( 35 )( )( )( 36 )( ) in English.

- ① Japanese people      ② is      ③ make mistakes      ④ it
- ⑤ to      ⑥ for      ⑦ natural

37), 38) これはおじにもらったギターです。

This ( )( )( 37 )( )( )( 38 )( ).

- ① given      ② by      ③ to      ④ me
- ⑤ is      ⑥ the guitar      ⑦ my uncle

39), 40) 試合は7時までには終わっているはずです。

( )( )( 39 )( )( )( 40 )( ).

- ① be      ② seven o'clock      ③ game      ④ over
- ⑤ ought to      ⑥ the      ⑦ by