

2023年度

西武台高等学校入試問題

【数 学】 (50分) 〈満点：100点〉

【注意事項】 円周率は、 π として計算して下さい。

次の各問いに答えなさい。

問1 $\frac{5}{2} - \left(\frac{3}{4}\right)^2 \div \left(\frac{3}{4} - \frac{1}{8}\right)$ を計算し、次の①～⑤のうちから1つ選びなさい。

- ① $-\frac{1}{2}$ ② $\frac{8}{5}$ ③ $\frac{31}{10}$ ④ $\frac{13}{10}$ ⑤ $\frac{7}{6}$

問2 $\frac{5x-y}{2} + \frac{4x+3y}{5}$ を計算し、次の①～⑤のうちから1つ選びなさい。

- ① $\frac{9x+y}{10}$ ② $\frac{33x+2y}{10}$ ③ $\frac{x-2y}{7}$ ④ $\frac{9x+2y}{7}$ ⑤ $\frac{33x+y}{10}$

問3 $(-2a^2b)^2 \div (-3ab^2)^3 \times \left(\frac{3}{4}a\right)^2 \div \left(-\frac{1}{2}b\right)^4$ を計算し、次の①～⑤のうちから1つ選びなさい。

- ① $\frac{4}{3ab^6}$ ② $-\frac{4a}{3}$ ③ $-\frac{4a^3}{3b^8}$ ④ $-\frac{4ab^8}{3}$ ⑤ $\frac{4a^2}{3b^6}$

問4 $4(x+2y)^2 - 9(2x-y)^2$ を因数分解し、次の①～⑤のうちから1つ選びなさい。

- ① $(4x-y)(8x+7y)$ ② $(2x-9y)(2x-7y)$
 ③ $(-4x+y)(7x-y)$ ④ $(8x+y)(-4x+7y)$
 ⑤ $(8x-y)(4x-7y)$

問5 $\sqrt{3}(\sqrt{6}-\sqrt{2}) - \sqrt{48} \div \sqrt{2} + \frac{6}{\sqrt{2}}$ を計算し、次の①～⑤のうちから1つ選びなさい。

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

問6 1次方程式 $\frac{3-2x}{3} - \frac{3x-5}{2} = -3$ を解き、次の①～⑤のうちから1つ選びなさい。

- ① $x=1$ ② $x=2$ ③ $x=3$ ④ $x=4$ ⑤ $x=5$

問7 2次方程式 $(x-4)(x+3) = 6(x-4)$ を解き、次の①～⑤のうちから1つ選びなさい。

- ① $x=-3, 4$ ② $x=3, 4$ ③ $x=2, 6$ ④ $x=3, 6$ ⑤ $x=2, -6$

問8 280にできるだけ小さい自然数をかけて、ある自然数の2乗にしたい。このとき、かける自然数を求め、次の①～⑤のうちから1つ選びなさい。

- ① 7 ② 10 ③ 14 ④ 35 ⑤ 70

問9 比例式 $(x+4):(x+3)=14:11$ について、 x の値を求め、次の①～⑤のうちから1つ選びなさい。

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

問10 $a = \sqrt{5} + \sqrt{3}$, $b = \sqrt{5} - \sqrt{3}$ のとき, $a^2 - b^2$ の値を求め, 次の①~⑤のうちから1つ選びなさい。

① $2\sqrt{15}$ ② $3\sqrt{5}$ ③ $5\sqrt{3}$ ④ $4\sqrt{15}$ ⑤ 8

問11 濃度3%の食塩水100gに濃度5%と7%の食塩水を加えて, 濃度6%の食塩水を700gつくりたい。濃度5%と7%のそれぞれ何g加えればよいかを求め, 次の①~⑤のうちから1つ選びなさい。

① 5%…100g ② 5%…150g ③ 5%…200g ④ 5%…250g ⑤ 5%…300g
7%…500g 7%…450g 7%…400g 7%…350g 7%…300g

問12 ある店で同一商品を2つ以上まとめて購入すると, 1つ目は定価のままであるが, 2つ目以降は定価の2割引きの価格となる。この商品をまとめて3つ購入したところ, 定価で3つ購入するより480円安くなった。この商品の定価を求め, 次の①~⑤のうちから1つ選びなさい。

① 1100円 ② 1200円 ③ 1300円 ④ 1400円 ⑤ 1500円

問13 A君は, 家から駅まで1850mの道のりを, はじめは分速70mで歩き, 途中から分速150mで走ったところ, 家を出発してから23分後に駅に着いた。A君が走った道のりを求め, 次の①~⑤のうちから1つ選びなさい。

① 450(m) ② 500(m) ③ 550(m) ④ 600(m) ⑤ 650(m)

問14 2けたの自然数がある。この自然数の十の位の数は一の位の数より4小さい。また, 一の位の数の2乗はもとの自然数より12大きい。このとき, もとの自然数を求め, 次の①~⑤のうちから1つ選びなさい。

① 15 ② 26 ③ 37 ④ 48 ⑤ 59

問15 5人の生徒A, B, C, D, Eさんが校門を背景に写真撮影をしようとしている。5人のうち, BさんとDさんは必ず両端に並ぶものとする。このとき5人の並び方は何通りあるかを求め, 次の①~⑤のうちから1つ選びなさい。

① 11通り ② 12通り ③ 13通り ④ 14通り ⑤ 15通り

問16 赤い球が1個, 青い球が2個, 緑の球が3個入った袋がある。この袋から同時に2個の球を取り出すとき, 2種類の色の球を取り出す確率を求め, 次の①~⑤のうちから1つ選びなさい。

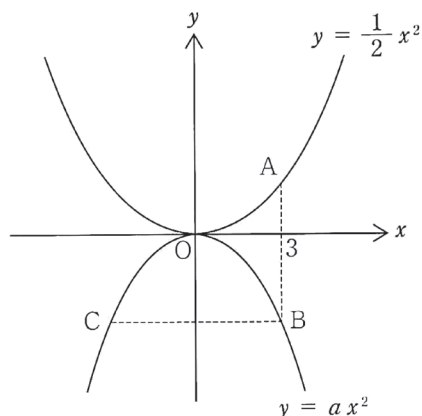
① $\frac{4}{15}$ ② $\frac{7}{15}$ ③ $\frac{9}{15}$ ④ $\frac{11}{15}$ ⑤ $\frac{13}{15}$

問17 直線 l は切片が -5 であり, 点 $(4, 3)$ を通る。この直線 l と x 軸との交点の座標を求め, 次の①~⑤のうちから1つ選びなさい。

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

問18 右の図のように、2つの関数 $y = \frac{1}{2}x^2$, $y = ax^2$

($a < 0$)のグラフがある。それぞれのグラフ上に
 x 座標が3である点をA, Bとする。また、Bを
 通り、 x 軸に平行な直線と $y = ax^2$ のグラフの交
 点のうちBと異なる点をCとする。AB=BCが
 成り立つとき、 a の値を求め、次の①~⑤のうち
 から1つ選びなさい。



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

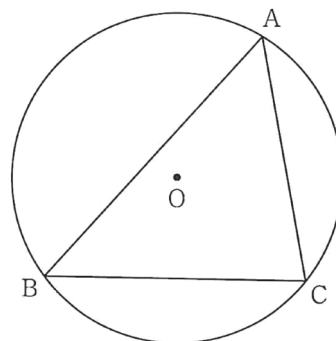
問19 放物線 $y = \frac{1}{2}x^2$ のグラフ上の $-2 \leq x \leq 4$ における y の値の範囲の両端となる2点を通る直線

の式を求め、次の①~⑤のうちから1つ選びなさい。

- ① $y = -x$ ② $y = x + 4$ ③ $y = -x + 4$ ④ $y = 2x + 2$ ⑤ $y = 2x$

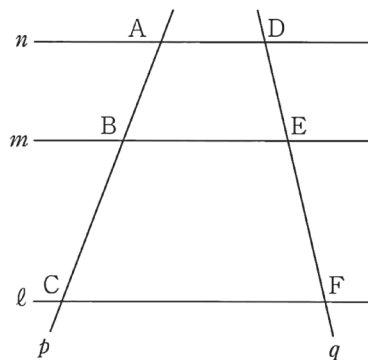
問20 右の図のように、3点A, B, Cを通る円Oがある。 $\angle BAC = 52^\circ$ のとき $\angle OBC$ の大きさを求め、次
 の①~⑤のうちから1つ選びなさい。

- ① 36° ② 38° ③ 40°
 ④ 42° ⑤ 44°



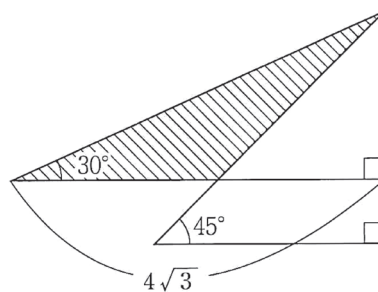
問21 右の図のように、3つの平行な直線 l , m , n に2
 つの直線 p , q が交わっている。AD=3cm, BE=
 5cm, CF=8cm, DE=3cmのとき、EFの長さを求
 め、次の①~⑤のうちから1つ選びなさい。

- ① $\frac{7}{2}$ (cm) ② 4(cm) ③ $\frac{9}{2}$ (cm)
 ④ 5(cm) ⑤ $\frac{11}{2}$ (cm)



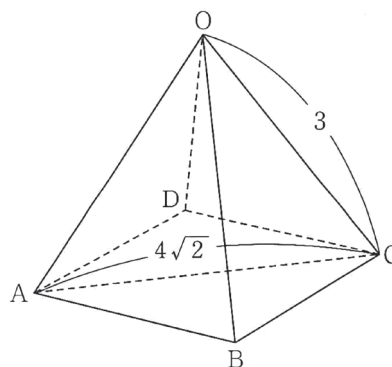
問22 右の図のように、2枚の三角定規を重ねたとき、斜線部の面積を求め、次の①～⑤のうちから1つ選びなさい。

- ① $6\sqrt{3}$ ② 8 ③ $8\sqrt{3}$
 ④ $\sqrt{3}$ ⑤ $8\sqrt{3}-8$



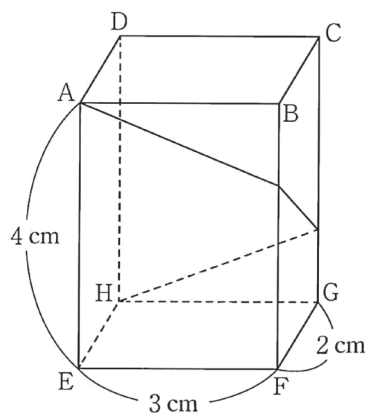
問23 右の図のように、正四角錐O-ABCDがある。この正四角錐O-ABCDの体積を求め、次の①～⑤のうちから1つ選びなさい。

- ① $\frac{4}{3}$ ② $\frac{8}{3}$ ③ $\frac{16}{3}$
 ④ 8 ⑤ 12



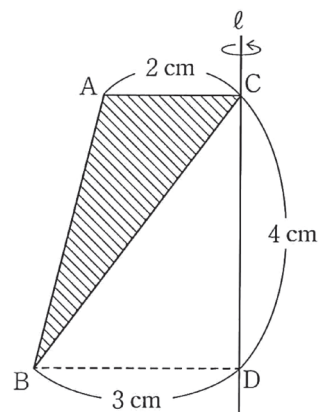
問24 右の図のように、直方体ABCD-EFGHがある。頂点Aから辺BF、辺CGを通り、頂点Hまで1本のひもでつなぐ。このとき、最短となるひもの長さを求め、次の①～⑤のうちから1つ選びなさい。

- ① $3\sqrt{5}$ (cm) ② $4\sqrt{5}$ (cm)
 ③ $5\sqrt{5}$ (cm) ④ $6\sqrt{5}$ (cm)
 ⑤ $7\sqrt{5}$ (cm)



問25 右の図の△ABCを直線ℓで1回転したときにできる立体の体積を求め、次の①～⑤のうちから1つ選びなさい。

- ① $\frac{40}{3}\pi$ (cm³) ② 24π (cm³)
 ③ $\frac{76}{3}\pi$ (cm³) ④ $\frac{78}{3}\pi$ (cm³)
 ⑤ $\frac{112}{3}\pi$ (cm³)



【英語】 (50分) 〈満点：100点〉

最も強く発音される部分(第1アクセント)の位置が他の3つと異なるものを①～④のうちから1つ選びなさい。

- 問1 ① pro-gram ② pat-tern ③ stu-dent ④ ad-vice
 問2 ① to-ma-to ② mu-si-cian ③ del-i-cate ④ ba-nan-a

下線部の発音が他の3つと異なるものを①～④のうちから1つ選びなさい。

- 問3 ① town ② cloud ③ about ④ group
 問4 ① either ② mother ③ three ④ weather

日本文の内容を表すように()内の語句を並べ替えた場合、3番目と6番目に来るものの組み合わせとして最も適切なものを①～④のうちから1つ選びなさい。ただし、文頭に来るべきものも小文字になっている。

- 問5 話がうますぎて本当とは思えなかった。
 (1 the story 2 to 3 good 4 be
 5 was 6 too 7 true).
 ① 6-2 ② 6-4 ③ 7-2 ④ 7-5
- 問6 私は1時間ずっとピアノを弾いています。
 (1 playing 2 have 3 the piano 4 I
 5 been 6 for) an hour.
 ① 5-6 ② 5-3 ③ 3-5 ④ 3-6
- 問7 あなたはそのようなことをするべきではない。
 (1 such 2 you 3 thing 4 should
 5 do 6 no 7 a).
 ① 1-6 ② 1-4 ③ 6-7 ④ 6-4
- 問8 中村さんは、今オフィスにいません。
 (1 out 2 Mr. Nakamura 3 office 4 his
 5 of 6 is) now.
 ① 1-5 ② 1-3 ③ 5-6 ④ 5-3
- 問9 答える前に、あなたにあるものを見せたいのです。
 Before (1 would 2 like 3 I 4 answering,
 5 to 6 you 7 show 8 something).
 ① 4-2 ② 4-6 ③ 1-5 ④ 1-7
- 問10 あなたには韓国に住んでいる友達はいますか。
 (1 have 2 live 3 you 4 do
 5 any friends 6 in Korea 7 who)?
 ① 1-2 ② 1-4 ③ 4-7 ④ 4-6

問11 彼は慶子がいつ来るか知っている。

- (1 come 2 when 3 will 4 knows
 5 Keiko 6 he).
 ① 2-3 ② 2-1 ③ 4-2 ④ 4-5

次の会話文の()に入れるのに最も適切なものを①～④のうちから1つ選びなさい。

問12 A : Hi, my name is Miyu. Nice to meet you.

B : Hello, Miyu. My name is Koji. Nice to meet you, too.

A : If you have any questions, ()

B : Thank you. Well, could you tell me how to get to a computer room?

- ① I have never used a computer.
 ② please feel free to ask me.
 ③ I want to be your friend.
 ④ let me give you some examples.

問13 A : Good afternoon, Mr. James.

B : Hi, what's up?

A : I would like to write about you for our newspaper, so ()

B : Of course. What do you want to know?

- ① how can I answer your questions?
 ② may I ask you some questions?
 ③ shall I answer your questions?
 ④ what questions should I ask you?

問14 A : Hello, this is Kento speaking.

B : Hi, Kento. It's John. Well, I am calling you because ()

Have you ever seen it in your house?

A : No, I haven't. I'm going to check my house.

- ① I received a letter from you.
 ② I'm lost and I don't know where I am.
 ③ I bought books yesterday.
 ④ I lost my watch.

問15 A : Oh, the printer is broken again.

B : ()

A : I think so.

- ① Print it on both sides.
 ② Should we call a technician?
 ③ Order new paper.
 ④ I have already used it.

次の英文の空欄を補うのに最も適切なものを①～④のうちから1つ選びなさい。

- 問16 When I entered the living room, my father was () on the sofa.
 ① lie ② lay ③ lain ④ lying
- 問17 “() do you like better, novels or poems?” “I like poems better.”
 ① How ② Which ③ When ④ Why
- 問18 I’m () tried to study harder.
 ① to ② as ③ too ④ enough
- 問19 I have known him () ten years.
 ① since ② before ③ after ④ for
- 問20 I have a book () tells us how to play tennis.
 ① who ② whom ③ which ④ of which

次の英文を読み、次のページの問いに答えなさい。

Teacher : Today let’s have a *debate between two teams. The title is “Video Games — Are They Good or Bad for Children?” Let’s start! Team A, please.

Susan : (1) for children. Here’s one reason. Children love video games. When they play video games, they have a lot of fun. When people have fun, they are happy — and when people are happy, they are nice to other people. This makes all of society better. So video games are good for society.

Shunichi : Here’s another reason. Sometimes, it is hard for children to start talking to a new friend. But if they play video games together, they can start talking about the video games. Then, after that, they can talk about many things. (2).

Teacher : OK. Team B, what do you think about Team A’s reasons?

Rob : Team A’s first reason is not all true. When children play video games, they may have fun, but they are not really nice to other people. For example, when my brother is playing video games, (3).

Rumiko : Team A’s second reason has a problem. Many children play video games by themselves for hours and hours, so they never have time to make friends.

Teacher : OK. Team B, (4) for children. Give us your reasons.

Rob : We think video games are bad for children because they are *violent. Most games are about fighting and war. When children play violent games all day, they become angry. They are not nice to other people. Someday, they may fight in a real war.

Rumiko : When children play video games, they don’t study. By studying, children can learn many useful things for their future. What can children learn for their future by playing video games? Nothing!

Teacher : OK. Team A, what do you think about Team B’s reasons?

Susan : Every child feels angry sometimes. By playing video games with fighting, children can *express their anger without really hurting anyone.

Shunichi : Some video games are not violent. There are many kinds of video games, and some

are about culture or history. From those kinds of games, children can (5).

What do you think? Do you agree with Team A or Team B? Or both?

(注) debate : 討論 violent : 暴力的な express : (感情を)示す, 表現する

問21 (1)に入れるのに最も適切なものを①～④のうちから1つ選びなさい。

- ① We think video games are bad
- ② Our teacher thinks video games are bad
- ③ We think video games are good
- ④ Our teacher thinks video games are good

問22 (2)に入れるのに最も適切なものを①～④のうちから1つ選びなさい。

- ① So video games help children to make friends
- ② However, video games don't help children to make friends
- ③ So video games are not good for children
- ④ However, video games are not good for children

問23 (3)に入れるのに最も適切なものを①～④のうちから1つ選びなさい。

- ① he enjoys playing them with his mother
- ② he is really nice to other people
- ③ he doesn't even talk to my mother and me
- ④ he doesn't eat anything at all

問24 (4)に入れるのに最も適切なものを①～④のうちから1つ選びなさい。

- ① you think video games are good
- ② you think video games are bad
- ③ your mother thinks video games are good
- ④ your mother thinks video games are bad

問25 (5)に入れるのに最も適切なものを①～④のうちから1つ選びなさい。

- ① feel angry and fight in a real war
- ② play violent games all day with their friends
- ③ express their anger without really hurting anyone
- ④ learn many useful things for their future

次の英文を読み、設問の英文を完成させるのに最も適切なものを①～④のうちから1つ選びなさい。

What do you want to do in the future? What kind of person do you want to be? Today, I will talk about three people.

The first person is my uncle. He works at a hospital as a children's doctor. Why did he decide to be a children's doctor? One day, when he was a junior high school student, he learned on TV that so many children around the world could not get medical *treatment at hospitals because they were poor. He said to me. "No one thought I would become a doctor. But I studied very hard." After he graduated from high school, he chose his job. He also said, "I remember all the children who were in my hospital. I need to study harder to be a better doctor, and I will help more

children.” I hear that he will work abroad in the future. I think that he will help many sick children all over the world.

The second person is a woman who was born in America about 150 years ago. When I was ten years old, I went to an elementary school in Nebraska, America. One day, our teacher told us about a black woman. Her father and mother were *enslaved. Many black people had to live like them in America at that time. I was very surprised to hear that. Her father and mother escaped and became free. After that, she was born. When she was a small child, she wanted to be like her mother. Her mother was a nurse. She often visited sick people with her mother. She was a very good student at school. She studied very hard. Finally, she graduated from medical college. That was about 120 years ago. A few years later, she moved to Nebraska. She became the first black woman doctor in Nebraska. She helped sick people there for fifty years.

The third person is a girl living in Pune, India. I learned about her on the Internet. She is thirteen years old. Her dream is to be a doctor. But some people who live near her house, especially old people, want her to get married before her eighteenth birthday. In Pune, about 40% of girls get married before the age of eighteen. She works on children’s problems in India and tries to find ways to make her country better. She often tells her friends to study with her. She says that they can change their futures if they study harder. She gets up at three thirty every morning and studies hard to *fulfill her dream. Her father says, “Studying hard is good. I am proud of her.” She is glad to hear that. She says, “I have a dream. No one can stop it.” I think that she is now studying very hard.

In the future, I want to be a doctor and work abroad. Like these three people, I want to be kind to other people and study hard to fulfill my dream. I think that a lot of sick children need someone who gives them support. I hope that I can give them medical treatment. So, I study very hard every day, especially English. I can work with more people around the world if I use English. Everyone can help someone who needs support. I believe that the world will be a better place if people help each other.

(注) treatment : 治療 enslave : 奴隷にする fulfill : 叶える

問26 The writer’s uncle decided to be a children’s doctor because _____ .

- ① it was important for him to study medical treatment
- ② he wanted to go abroad in the future to help more adults
- ③ he learned that children around the world were too poor to get medical care
- ④ his mother worked at a hospital as a nurse

問27 The writer was very surprised to hear that _____ .

- ① many black people were not able to take care of their children
- ② many black people were enslaved in America about 150 years ago
- ③ many black people worried about their own families during working
- ④ many black people studied hard to fulfill their dream

問28 The first black woman doctor in Nebraska _____.

- ① escaped and became free
- ② graduated from medical college about 50 years ago
- ③ graduated from medical college after moving there
- ④ did her best to save sick people there for fifty years

問29 In Pune, _____.

- ① about 60% of girls don't get married before the eighteen-year-old
- ② about 40% of boys get married before the age of 18
- ③ many young people want to get married before their eighteenth birthday
- ④ many young people get up at three thirty every morning and study hard to fulfill their dreams

問30 The writer believes that _____.

- ① no children need someone who supports them
- ② he has never given children medical treatment
- ③ he can work with more people around the world if he gets medical treatment
- ④ helping each other will make the world better