

Шифр:

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**ПИСЬМЕННАЯ РАБОТА УЧАСТНИКА  
ОЛИМПИАДЫ ШКОЛЬНИКОВ СПбГУ  
2016–2017**

заключительный этап

Предмет (комплекс предметов) Олимпиады СОВРЕМЕННЫЙ МЕНЕДЖЕР

Город, в котором проводится Олимпиада Кертекашск

Дата 12.03.2017

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**Вариант 3**

**Математика (Современный менеджер)**

Первые 6 задач оцениваются в 3 балла каждая. Остальные по 4 балла.

*Часть 1. В задачах 1 – 4 Вам следует обвести в соответствующей графе правильный ответ. (Если Вы случайно выделили не ту клетку, то обведите нужный ответ и напишите его еще раз на полях.)*

Задачи		Ответы			
1.	Сколько целых решений имеет неравенство $\log_5 x + \log_7 x \leq \log_3 x$ .	$\infty$	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	$a = \arctg 1 + \arctg \frac{1}{2} + \arctg \frac{1}{3}$ . Вычислите $\cos a$	-1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
3.	Наименьший положительный корень уравнения $\tg 5x = \ctg 3x$ равен	$\frac{\pi}{24}$	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	Сколько корней имеет уравнение $\frac{x-1}{x-2} = 1 - 2x^2$ ?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Часть 2. В задачах 5 – 8 следует записать ответ справа от условия задачи (в пустой графе)*

5.	При каких значениях $a$ уравнение $\frac{\sqrt{x}-1}{\sqrt{x}-2} = a\sqrt{x} + \frac{1}{2}$ имеет два решения?	$a \in (-\infty; -\frac{1}{4}] \cup (0; +\infty)$
6.	В треугольнике со сторонами 5, 6 и 7 через центр вписанной окружности параллельно средней стороне проведена прямая. В каком отношении она делит площадь треугольника?	4 : 5
7.	Решите уравнение $2x^2 + 6x + 2 = 5\sqrt{x}(x+1)$ .	$x = 1$
8.	В трапецию, длины оснований которой относятся как 2 : 7, а длины боковых сторон как 3 : 4, вписана единичная окружность. Найдите площадь трапеции.	



VOCABULARY AND GRAMMAR

- organising the work in the most efficient manner
- controlling what has been done to ensure that it meets the plan.

These four areas have remained the cornerstone of management. While companies may have changed their hierarchies and become leaner and flatter, the tasks carried out by managers have remained largely unchanged. The Marketing Manager needs to prepare the marketing plan, in terms of activities and budgets; then he or she needs to ensure that the plan is communicated to all those who are to be involved in its implementation; after this stage comes the implementation itself and the manager needs to organise the work of those who are to carry it out; and finally, to complete the process, the results need to be compared against the plan. What we have stated for the Marketing Manager is repeated throughout the company, with minor adaptations to fit each department's activities and concerns.

- 8 Company structures are based on
- A four principles.
  - B more than four principles.
  - C human nature.
  - D primitive societies.
- 9 According to the author, people like to
- A live in a well-ordered society.
  - B work together on shared tasks.
  - C have a degree of risk in their lives.
  - D work in clearly defined organisations.
- 10 Henry Ford provided
- A wide-ranging training for his workers.
  - B very repetitive training for his workers.
  - C beliefs and visions for his workers.
  - D narrowly focused training for his workers.
- 11 Today's workers
- A are simply tools of production.
  - B have lower expectations than their predecessors
  - C have recognisable requirements and wishes.
  - D are more efficient than their predecessors.
- 12 According to the author, successful managers need
- A to exercise a range of skills .
  - B to be good at planning tasks.
  - C to lead by example.
  - D to follow models from well-established companies.
- 13 Why does the author give marketing as an example?
- A because it is a typical management area
  - B because it is a unique management area
  - C because marketing is central to all company structures
  - D because companies today are marketing-driven

A. Complete the adjectives below filling the gaps with missing letters. Each adjective has a clue to help you.

I want to tell you about my cousins Jane and Mike.

Jane never does silly things under pressure (1. level - headed), she will help to solve all the problems (2. practical) and is a good judge in any dispute (3. for - midd). She puts her heart and soul into her profession (4. dedicated), and always stops to help a disabled person across the road (5. c\_ns\_d\_a\_e). She never forgets to send a card on her parents' anniversary (6. theghtful).

Mike is always the first to put his fists up (7. vilent) and he is quick to use them (8. bvutal). He won't let anything stand in his way (9. rehuse), and has no principles about hurting other people (10. unscrupuous). He seems to enjoy causing trouble (11. m\_i\_cous) and when hurt he'll try to take revenge (12. \_in\_iquitive).

B. For questions 1-4, think of one word only which can be used appropriately in all three sentences. Write ONLY the missing word.

Here is an example:

- 0 The thief ..... the watch into his pocket when he thought no one was looking. Several visitors to the castle almost ..... on the newly polished floor. The speaker ..... a few references to the local football team into his speech, which the audience appreciated greatly.

Answer: slipped

1. The old man couldn't take ..... food for a couple of days after his operation. The police say that there is no ..... evidence that Walter committed the crime. The ring was made of ..... gold.  
two real
2. Sweet fizzy drinks are a ..... cause of tooth decay. The new government is planning to introduce some ..... changes to the education system. The comic books he enjoyed as a child are a ..... influence on Henry's work.  
main
3. These papers mustn't ..... into the wrong hands. Take a scarf – there's a chilly wind and I don't want you to ..... ill. Everything seemed to ..... apart at the seams when Joe left.  
fall
4. Our savings have not accumulated much ..... Although they are divorced, Paul's ex-wife retains a legal ..... in his business. The children soon lost ..... in the game.  
interest

C. For questions 1-4, complete the second sentence so that it has a similar meaning to the first sentence, using the word given. Do not change the word given. You must use between TWO and FIVE words, including the word given.

Example:

- (0) Fernanda refused to wear her sister's old dress.

NOT

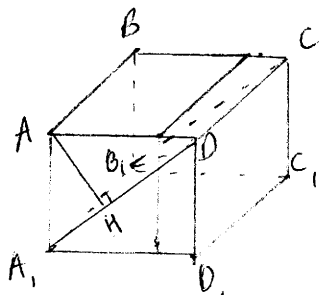
Fernanda said that SHE WOULD NOT WEAR her sister's old dress.

Часть 3. В задачах 9 – 10 следует справа в соответствующей графе написать ответ, однако дополнительно к этому следует кратко записать решение

9.	$ABCD A' B' C' D'$ – единичный куб. Найдите расстояние между прямыми $AB$ и $B'D$ .	$\frac{\sqrt{2}}{2}$
10.	При каком значении $x$ достигается наибольшее значение функции $y = \frac{\sqrt{2x-1}}{x+1}$ ?	2

Математика, решения заданий 9 и 10:

№ 9.



решение:  
 1)  $\rho(AB; B'D)$  найдем как  $\rho(AB; A'B'CD')$ , так как  $B'D \in (A'B'CD')$ ;  $AB \parallel (A'B'CD')$   
 2) проведем  $AH \perp A'D$ ;  $AH \perp (A'B'CD')$   
 $\Rightarrow AH = \rho(AB; A'B'CD')$   
 3) рассм.  $\triangle AA'D$ :  $\angle A = 90^\circ$ ;  $AA' = AD \Rightarrow A'D = \sqrt{AA'^2 + AD^2} = \sqrt{2}$ .  
 $AH$  – высота, медиана, т.к.  $\triangle AA'D$  – равноб.

$\Rightarrow AH = A_1H = HD = \frac{A_1D}{2} = \frac{\sqrt{2}}{2}$

Ответ:  $\frac{\sqrt{2}}{2}$ .

№ 10. Дан:  $y = \frac{\sqrt{2x-1}}{x+1}$

Найти:  $x$  для  $y$  наиб.  
 решение:  $y' = \left( \frac{\sqrt{2x-1}}{x+1} \right)'$

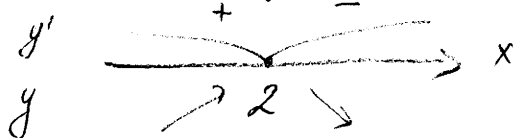
$$= \frac{(\sqrt{2x-1})'(x+1) - (x+1)'\sqrt{2x-1}}{(x+1)^2} = \frac{\frac{1}{2\sqrt{2x-1}} \cdot 2(x+1) - 1 \cdot \sqrt{2x-1}}{(x+1)^2}$$

$$= \frac{x+1 - \sqrt{2x-1}}{(x+1)^2 \sqrt{2x-1}} = \frac{x+1 - 2x+1}{(x+1)^2 \sqrt{2x-1}} = \frac{2-x}{(x+1)^2 \sqrt{2x-1}}$$

ОДЗ:  $2x-1 > 0$   
 $2x > 1$   
 $x > \frac{1}{2}$

$y' = 0$   
 $\frac{2-x}{(x+1)^2 \sqrt{2x-1}} = 0$

$2-x = 0$   
 $x = 2$  (удовл. ОДЗ)



Ответ:  $x = 2$ .

Обществознание (Современный менеджер)

- Перечислите основные функции политической партии: - мировоззренческая; - воспитательная; - интеграционная; - выработка политических программ; - выдвижение политических лидеров; - борьба за власть; - выражение интересов различных социальных групп;
- Установите соответствие между социальными общностями и критериями их выделения: к каждой позиции, данной в первом столбце, подберите соответствующую позицию из второго столбца.

СОЦИАЛЬНЫЕ ОБЩНОСТИ	КРИТЕРИИ
А) сибиряки	1. территориальный
Б) православные	2. этносоциальный
В) белорусы	3. религиозный
Г) горожане	
Д) русские	

Запишите в таблицу выбранные цифры под соответствующими буквами

А	Б	В	Г	Д
1	3	2	1	2

- Устойчивый рост цен на товары и услуги, связанный с одновременным повышением спроса на большинстве рынков страны, называют:

- 1) дефицитом
- 2) инфляцией спроса
- 3) инфляцией издержек
- 4) ажиотажным спросом

4. Запишите слово, пропущенное в таблице

ФАКТОР ПРОИЗВОДСТВА	ХАРАКТЕРИСТИКА
Труд	Деятельность людей по производству товаров и услуг путём использования их умственных и физических способностей, полученных в процессе обучения и работы, знаний и навыков
Земля	Все виды природных ресурсов, имеющих на планете и пригодных для производства экономических благ

5. Верны ли следующие суждения об издержках фирмы?

- А. Издержки фирмы могут изменяться в зависимости от спроса на продукцию фирмы.  
 Б. Издержки фирмы отражают стоимость используемых факторов производства.

- 1) верно только А
- 2) верно только Б
- 3) верны оба суждения
- 4) оба суждения неверны

6. Понятие «экономика» можно рассматривать в двух основных смыслах: как науку и как хозяйство. Экономику как «хозяйство» характеризует позиция:

- 1) изучение последствий мирового кризиса для финансового рынка
- 2) прогнозирование долгосрочного развития автомобильной отрасли
- 3) расчет последствий вступления в ВТО для внутреннего рынка страны
- 4) увеличение спроса на услуги косметических спа-салонов

7. Гражданин Н. закончил курс основ предпринимательства и решил основать собственное частное индивидуальное предприятие, заняться разработкой сайтов. Выберите в приведённом ниже списке преимущества подобной формы бизнеса и запишите цифры, под которыми они указаны.

- 1) лёгкость получения банковских кредитов
- 2) высокая степень сохранности коммерческой информации
- 3) простота организации и управления
- 4) не надо делиться прибылью с совладельцами
- 5) достаточно средств для рекламной кампании
- 6) возможность привлечь высококлассных специалистов

8. Учёные изучают социальную структуру современного общества. Какие методы, отличающие научное познание от других видов познавательной деятельности, могут ими применяться?

- 1) моделирование процессов социальной дифференциации в условиях экономической неустойчивости
- 2) выдвижение и проверка гипотез о направлениях социальной политики по смягчению неравенства доходов
- 3) сбор статистических данных путём анкетирования
- 4) разработка и реализация комплекса мер государственной поддержки малоимущих семей
- 5) описание случаев социальной дифференциации населения
- 6) оценка фактов социального расслоения общества с позиций идеалов равенства и справедливости

1. A visa is not required when you travel within Europe.  
**NEED**  
You ... *do not need* ... a ... *visa* ... when you travel within Europe.
2. Helen hasn't been to Chicago since 1996.  
**LAST**  
The *last* ... *time* ... *Helen has visited* ... Chicago was in 1996.
3. "Lets go out!" Mary said.  
**SUGGESTED**  
Mary ... *suggested* ... *going* ... out..
4. The students found the speech rather boring.  
**WITH**  
The students ... *were bored with* ... the speech.

## Reading

### TEXT I

- You are going to read an article about jobs in Britain that used to be common but are uncommon now.
- For questions 1-7, choose from the sections of the article (A-C).
- The sections may be chosen more than once.

#### In connection with which of the jobs are the following mentioned?

1. how hard it can be to find someone who does this job? *B*
2. a significant event involving people doing this job? *C*
3. the kind of people who need this kind of expertise? *B*
4. a prediction that proved to be accurate? *A*
5. the kind of people still doing this job? *C*
6. a positive result of not many people doing this job anymore? *A*
7. something that people doing the job now find surprising? *B*

### THE WAY WE WORKED

*Britain's disappearing jobs, and the people keeping them alive.*

#### A Advertising signwriter

A couple of years into his career, Wayne Tanswell told his father he was in a dying trade. Having left school in 1980, to train in sign-painting, he then watched as high streets moved to plastic shop-front lettering. 'But my dad said: "Wait and stick at it; these things will come back. The more technology comes into it, the more you'll be seen as a specialist." He had a lot of foresight.'

Technology has helped Tanswell. Now that his trade has become such a rare one, he is summoned far from his home, with work ranging from period numerals by the doors of London houses to shop fronts in villages with strict planning restrictions.

Sam Roberts curates an online archive, blog and burgeoning maps of hand-painted wall ads. These signs, painted onto brickwork, once kept sign-painters in demand. Their work remains, faded but unmistakable, in many cities. 'Mention them to people and they'll look quizzical,' Roberts says, 'but next time they see you, they'll have started to spot them.'

#### B Typewriter repairer

Though a few thousand new electric models are still sold in Britain each year, the typewriter is not what it once was. Search online for a once-indispensable brand of correction fluid and the first page of hits will be for something completely different. Search your high street for a typewriter repairman and your chances of a result

at all are ribbon-thin.

There are still a handful of typewriter repair businesses operating in Britain, mostly on the South Coast. They not only serve septuagenarian retirees and technophobes (and diehard novelists who shun PCs), but are also approached by people weaned on digital keyboards who see typewriters as relics of a distant past.

In 1986, George Blackman set up an equipment and typewriter repair shop. He trained on the old manual machines and Blackman's employees still find themselves working on those beautiful, formidably heavy old machines. 'It amazes us the price the old manual machines sell for on the Internet,' one explains, and their new buyers want them spruced up when they've splashed out. They get the old machines gleaming and operational by raiding the vast collection of spare parts they've accumulated over the years (and you can't buy them any more).

#### C Matchgirl

There's a light that never goes out, even if it burns less brightly than it once did. Female match-makers have long been a celebrated part of British labour history. In 1888, thousands of matchgirls at the Bryant and May factory in London famously went on strike to protest over conditions. Over subsequent decades, the long hours, tiny pay packets and exposure to toxic chemicals were addressed before the industry largely relocated its production to other countries where labour was cheaper.

Today, there are still female match-makers in Britain – in Bristol, at the country's last match factory. Octavius Hunt. The company long ago diversified into other products but still makes matches. Its commercial director, Kerry Healey, says that the majority of staff are still female. 'Matches are a small part of our business, but an important one. Depending on the size of orders, we have between two and 12 people working in the department, of which two are men – so it's still mainly female.'

### TEXT II

Read the text about the origins of company structure. For each question (8-13), choose one letter (A, B, C or D).

#### WHAT ARE THE ORIGINS OF COMPANY STRUCTURE?

If we look at the structures of companies, we can see how they have reflected the current mix of ideologies at any one time: political, social, legal and economic, to mention but four. On the other hand, we can also say that structure is a normal feature of human nature. In other words, we prefer organisation to chaos and we respond well to clearly defined areas of activity. In this way we can see in the earliest communities the beginnings of organisational structure.

If we look for the practical applications of this thinking, a good starting point is the Ford Motor Company. Henry Ford, who set up his automobile manufacturing company in 1903, firmly believed that efficiency in the workplace was based on providing just that mix of knowledge and skills required to carry out a single, often repetitive, task. Therefore the training provided to his workers focused on what was needed to do the job.

Today, companies structured according to this approach would be considered very minimalist since they are only concerned with narrow areas of competence. Modern management has had to pay much more attention to the needs of the workforce and find ways to motivate them. Today's worker is not only a unit of production, but also a resource with clearly defined needs and wants. This, in turn, has had implications for companies in the way they structure and organise their activities. This move to a more human face came at a time of rapid industrial change and gave the workers a new position in the company hierarchy. In addition, management began to change, moving away from more autocratic models, where a single leader has total power, to broader ones involving a greater degree of power-sharing. This breadth was reflected in the particular mix of skills needed for success. These can be summarised as:

- planning what needs to be done
- leading the team of colleagues and workers who are going to do it