1.

If $\dfrac{1}{R} = \dfrac{1}{R_1} + \dfrac{1}{R_2}$, then

○ $R = \dfrac{R_1 + R_2}{R_1 \cdot R_2}$

○ $R_1 = R_2$

○ $R = R_1 + R_2$

○ $R = \dfrac{R_1 \cdot R_2}{R_1 + R_2}$

2.

Solve the equation $(x + 1)^2 - 3x = -5 + x^2$.

$x = $

Answer: _____

3.

You bought headphones at a 30 % discount. You paid 140 EUR.
What was the original price?

Answer: _____

4.

The following two bar charts represent the age distributions of boys and girls in a certain kindergarten group.Which of the following statements are true?
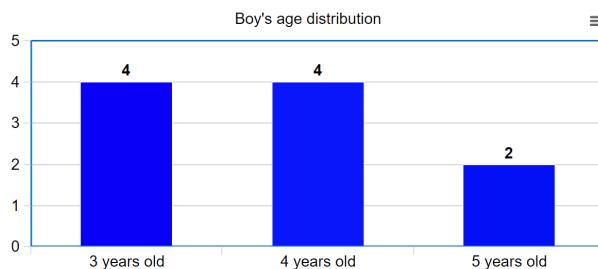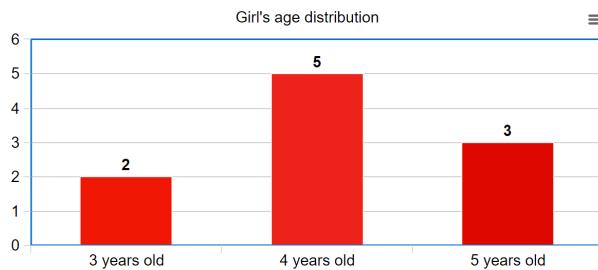

☐ **The average age of the boys is higher than the average age of the girls.**

☐ **Altogether there are 24 children in the group.**

☐ **14 children in the group are older than 3 years.**

☐ **If another child aged 5 years joins the group, the average age of all children will be exactly 4 years.**

☐ **There are more girls than boys in the group.**

5.

It takes 3 workers 4 hours to paint the whole room. How long does it take 8 workers to paint the same room? Assume that all workers paint at the same rate. Give your answer in minutes.

Answer: _____

6. Let $a, b > 0$ and $a, b \in \mathbb{R}$. Which line can be described by $ay + x = b$?
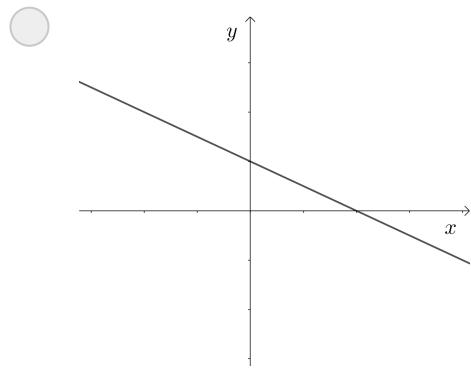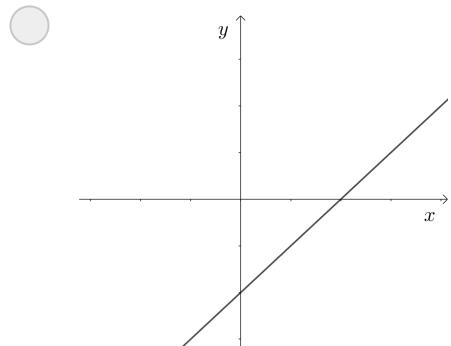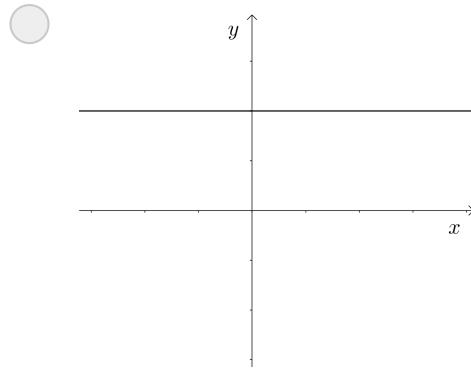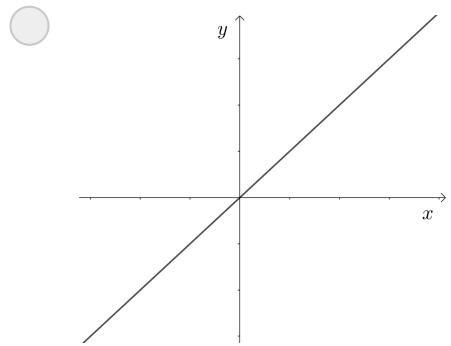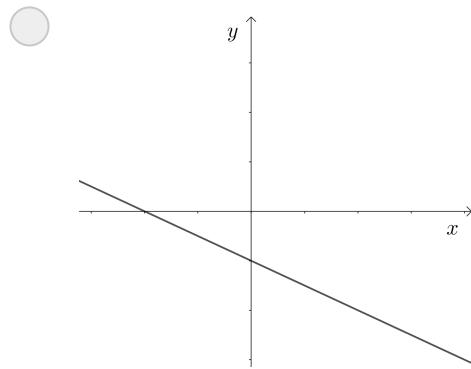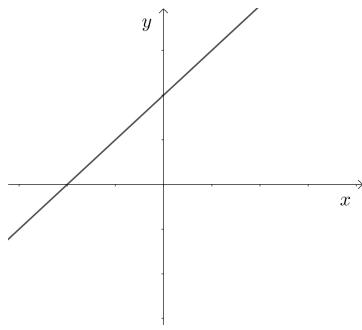
7.	The displacement-time graphs of two cars driving along the same straight line are shown in the diagram below. Which of the following statements are true?
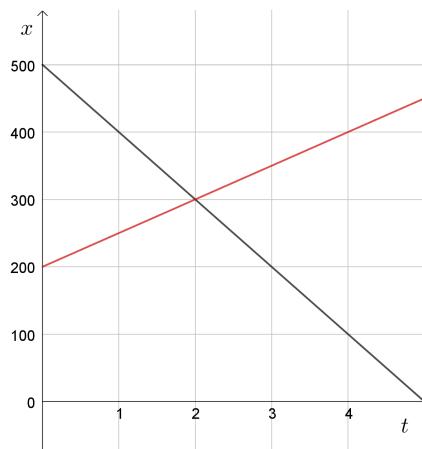
☐	**Initially the cars were 500 m apart.**

☐	**The cars are driving in the same direction.**

☐	**The cars meet.**

☐	**One car is accelerating, the other car is decelerating.**

☐	**The acceleration of both cars is 0.**

8.	Let $n \in \mathbb{N}$. For which values of n is $\left(\dfrac{n}{2} - \dfrac{n-4}{4} - 1 \right)$ an integer (whole number)?

○	**For all positive multiples of 4.**

○	**Such values of n do not exist.**

○	**For all odd positive integers.**

○	**For all even positive integers.**

9.	On which object have humans (or their technology) set foot on?

○	**Saturn**

○	**Star**

○	**Comet**

○	**Meteor**

10.   Approximately, how many beats will a heart make in a lifetime?

○ 10^2

○ 10^5

○ 10^9

○ 10^{13}

○ 10^{17}

11.   When water is boiling, what is inside the bubbles?

○ **Nothing**

○ **Water**

○ **Oxygen**

○ **Nitrogen**

○ **CO_2**

12.   After the surgical removal of a diseased gallbladder, a patient must be careful to limit their intake of:

○ **Proteins**

○ **Lipids**

○ **Minerals**

○ **Simple carbohydrates**

13.   What can be treated with penicillin?

○ **Covid-19**

○ **Common cold**

○ **Flu**

○ **Urinary tract infection**

14.   Before the first photosynthetic organisms appeared, the Earth's atmosphere contained

○ **hydrogen, oxygen and hydrogen sulfide.**

○ **hydrogen, water, oxygen and hydrogen sulfide.**

○ **hydrogen, carbon monoxide and hydrogen sulfide.**

○ **hydrogen, methan, oxygen and hydrogen sulfide.**

15. Arteries are vessels that

    ○ **always carry oxygenated blood.**

    ○ **bring blood to the brain only.**

    ○ **bring blood out of the heart.**

    ○ **bring blood into the heart.**

16. The storage polysaccharide in human liver is

    ○ **cellulose.**

    ○ **glycogen.**

    ○ **starch.**

    ○ **glucose.**

17. Consider the following substances:
    A: graphite
    B: water
    C: salt (NaCl)
    D: sugar (saccharose)

Which of the following answers orders these substances according to their melting points, from the lowest to the highest?

    ○ **B < D < A < C**

    ○ **B < C < A < D**

   ○ **B < D < C < A**

    ○ **B < C < D < A**

18. An antacid relieves an overly acidic stomach because the main components of antacids are

    ○ **neutral.**

    ○ **acids.**

    ○ **isotopes.**

    ○ **bases.**

19. For some substances found in the household, the pH at room temperature was measured.
The following substances were used in the experiment:
   A: baking soda
   B: drain cleaner
   C: milk
   D: fresh lemon juice

Which of the substances has the lowest pH value?

   ◯ **B**

   ◯ **D**

   ◯ **A**

   ◯ **C**

20. The dotted line represents the volume of carbon dioxide evolved when excess calcium carbonate is added to hydrochloric acid.
Which graph represents the production of carbon dioxide when excess calcium carbonate is added to the same volume of hydrochloric acid of double concentration?
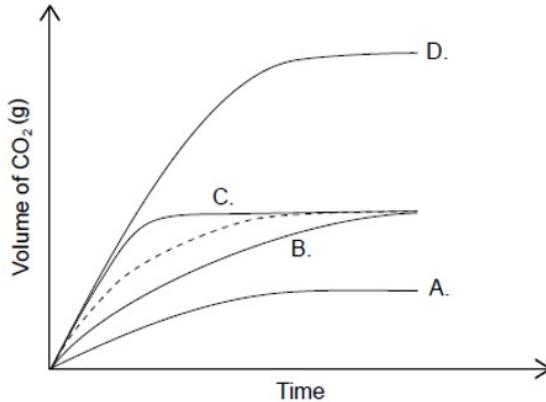
   ◯ **Graph A**

   ◯ **Graph B**

   ◯ **Graph C**

   ◯ **Graph D**

21. Iron naturally occurs in the form of oxides within various minerals.
One of these minerals of iron oxide is hematite (Fe_2O_3). About 10 tons of ore containing 70% hematite are mined daily in a mine.
Estimate how many tons of elemental iron per day are isolated from the obtained hematite. Round your answer to one decimal place.
$A_r(Fe) = 55.85$, $A_r(O) = 16.00$

Answer: _____

22. When Leo was born on 7th August, his grandmother said: he is born in the Leo zodiac sign, he will be strongminded, self-reliant, decisive and determined. He will express good leadership skills and self-confidence. When Leo grew up, he had many of the traits above.
Which of the following factors had the strongest influence in the development of those personality traits?

- ◯ **His own internal motivation.**

- ◯ **The fact that he was born in the Leo zodiac sign.**

- ◯ **His parents' personality traits.**

- ◯ **His parents' expectations.**

23. In 2003 a team of researchers – Caspi et al – examined the role of a gene 5-HTT in depression. They divided participants into three groups based on the variations of the gene, asked them about stressful life events and tested them for depression. Their study showed that certain variations of the genes alongside with stressful life events, indeed, more often resulted in the development of depression.
Which one of the following best summarizes the findings of the study?

- ◯ **Inheriting certain versions of the 5-HTT gene will cause depression.**

- ◯ **Inheriting certain versions of the 5-HTT gene in connection to stressful life events will cause depression.**

- ◯ **Inheriting certain versions of the 5-HTT gene will increase the likelihood of developing depression.**

- ◯ **Inheriting certain versions of the 5-HTT gene interacting with stressful life events will increase one's likelihood of developing depression.**

24. A teacher at one of the primary schools wanted to see if her students spent too much time playing computer games. She gave her students questionnaires, asking them about the time spent playing. She got the following results:

	Average hours playing during the week	Standard deviation of the hours playing during the week	Average hours playing during the weekend	Standard deviation of the hours playing during the weekend
7th graders	2.4	0.75	2.9	0.80
8th graders	2.5	0.74	2.9	0.79
9th graders	2.6	0.75	3.1	0.81

A journalist summarized her findings with the title: *Are our 9th graders addicted? A recent study shows they spend more than 3 hours playing computer games a day during the week and almost 4 during the weekend.* Which one of the following summarizes the findings correctly?

○ **Most 9th graders spend playing computer games from 1.85 – 3.35 hours a day during the week and 3.91 a day hours during the weekend.**

○ **Most 9th graders spend playing computer games from 2.6 – 3.35 hours a day during the week and from 3.1 – 3.91 a day hours during the weekend.**

○ **Most 9th graders spend playing computer games for about 2.6 hours a day during the week and about 3.1 hours a day during the weekend.**

○ **Most 9th graders spend playing computer games from 1.85 – 3.35 hours a day during the week and from 2.29 – 3.91 hours a day during the weekend.**

25. What is true for representative democracy? Mark all correct statements.

☐ **The elected leaders decide upon daily governing tasks (consider issues, pass laws, make choices that affect all citizens).**

☐ **Each citizen represents themself.**

☐ **Citizens are directly involved in daily governing tasks (consider issues, pass laws, make choices that affect all citizens).**

☐ **Citizens elect leaders to represent their interests in the government.**

26. Which of the following European intellectual movements is known as the age that celebrated reason, and the ideas that were produced inspired many revolutionary developments in arts, politics, philosophy and science?

○ **The Renaissance**

○ **Hellenism**

○ **The Enlightenment**

○ **The Middle Ages**

27.   What is referred to as the "Black Thursday"?

○   **The first day of the Stock Market Crash in October 1929.**

○   **The Sarajevo Assassination in June 1914.**

○   **The Invasion of Germany in Poland in September 1939.**

28.   Match a form of government with its description.

Autocracy	A form of government which recognizes a divine being as the ultimate authority.
Oligarchy	One person has all the political power.
Theocracy	A belief that people should not be subject to any government.
Anarchy	A particular (small) group of people has all the political power.

29.   Complete the sentence by selecting one of the given options.
Not only _____ mathematics, but she likes physics, too.

○   **she likes**

○   **does she like**

○   **likes she**

○   **liking**

30.   Complete the sentence by selecting one of the given options
Once you _____ your test tomorrow, you'll be free to leave the examination area.

○   **are going to complete**

○   **will have completed**

○   **have completed**

○   **will complete**

31. **Read the book review below and decide which statement does not describe a character in the reviewed book.**

The Serpent King **by Jeff Zentner**

In this soul-tugging southern-set debut, Dill Early is the son of a zealous preacher and snake handler. Dill's best friend and secret crush, Lydia, is a proud outsider in their small town, a fashion blogger who plans to ride her self-created fame the hell out of Dodge after graduation. The third member of their tiny tribe is Travis, a tough-looking gentle giant with an abusive father, who escapes into an internet relationship and the world of his beloved fantasy series every chance he gets. Over the course of their senior year, the three grapple with impending separation, and the struggle to define and declare themselves in the face of other people's conservative expectations.

According to the text, which statement does NOT describe a character in the reviewed book?

○ **A character has a troubled relationship with a parent.**

○ **A character has a physical appearance which may be deceptive.**

○ **A character finds refuge in a non-existent world.**

○ **A character has left the town only to return famous.**

32. **Read two paragraphs from the literary work** *To Kill a Mockingbird* **by Harper Lee and answer the question below.**

When he was nearly thirteen, my brother Jem got his arm badly broken at the elbow. When it healed, and Jem's fears of never being able to play football were dispelled, he was seldom self-conscious about his injury. His left arm was somewhat shorter than his right; when he stood or walked, the back of his hand was at right angles to his body, his thumb parallel to his thigh. He couldn't have cared less, so long as he could pass and kick.

When enough years had gone by to enable us to look back on them, we sometimes discussed the events leading to his accident. I maintain that the Ewells started it all, but Jem, who was four years my senior, said it started long before that. He said it began the summer Dill came to us, when Dill first gave us the idea of making Boo Radley come out. I said if he wanted to take a broad view of the thing, it really began with Andrew Jackson. If General Jackson hadn't run the Creeks up the creek, Simon Finch would never have paddled up the Alabama, and where would we be if he hadn't? We were far too old to settle an argument with a fist-fight, so we consulted Atticus. Our father said we were both right.

The narrator and her brother disagreed about

○ **the exact time Simon Finch had paddled up the Alabama.**

○ **the role General Jackson played in their family history.**

○ **the circumstances that eventually brought about Jem's injury.**

○ **when Dill first came to them and made Boo Radley come out.**