

UZUPEŁNIA ZDAJĄCY

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| PESEL | <input type="text"/> |
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*miejsce
na naklejkę*

**PRÓBNY EGZAMIN MATURALNY
Z MATEMATYKI
POZIOM POSTAWOWY
DODATKOWE ZADANIA W JĘZYKU ANGIELSKIM**

DATA:

GODZINA ROZPOCZĘCIA:

CZAS PRACY: 80 minut

LICZBA PUNKTÓW DO UZYSKANIA: 25

Instrukcja dla zdającego

1. Sprawdź, czy arkusz egzaminacyjny zawiera 9 stron (zadania 1–17).
Ewentualny brak zgłoś przewodniczącemu zespołowi nadzorującego egzamin.
2. Rozwiązania i odpowiedzi zapisz w miejscu na to przeznaczonym przy każdym zadaniu.
3. Pisz czytelnie. Używaj długopisu/pióra tylko z czarnym tuszem/atramentem.
4. Nie używaj korektora, a błędne zapisy wyraźnie przekreśl.
5. Pamiętaj, że zapisy w brudnopisie nie będą oceniane.
6. Możesz korzystać z *Wybranych wzorów matematycznych*, cyrkla, linijki oraz kalkulatora prostego.
7. Na tej stronie oraz na karcie odpowiedzi wpisz swój numer PESEL i przyklej naklejkę z kodem.
8. Nie wpisuj żadnych znaków w części przeznaczonej dla egzaminatora.

Task 1 (0-1)

Finish the sentence. Select the correct answer from the options below.

The opposite reciprocal of the number $1 - \sqrt{3}$ equals

- A. $\frac{\sqrt{3}-1}{2}$ B. $\frac{1+\sqrt{3}}{2}$ C. $-\frac{1+\sqrt{3}}{2}$ D. $-1 + \sqrt{3}$

Task 2 (0-1)

Finish the sentence. Select the correct answer from the options below.

The amount of interest earned by the deposit of \$5 for 2 years at 2% per year compounded quarterly equals

- A. $\$ (5 \cdot 1.01^4 - 5)$ B. $\$ (5 \cdot 1.005^8 - 5)$ C. $\$ (5 \cdot 1.02^8)$ D. $\$ (5 \cdot 1.05^8)$

Task 3 (0-1)

Finish the sentence. Select the correct answer from the options below.

The number $|\sqrt{17} - 4| + |\sqrt{17} - 5|$ is equal to

- A. $2\sqrt{17} - 9$ B. $\sqrt{17} + 1$ C. 9 D. 1

Task 4 (0-1)

Finish the sentence. Select the correct answer from the options below.

The sum of all real numbers that satisfy the equation $(x^2 - 49)(x - 10)(x + 1) = 0$ is

- A. 9 B. 25 C. 58 D. 60

Task 5

The polynomials P and Q are given in the general form

$$P(x) = 5x^4 - 2x^2 + x \text{ and } Q(x) = 5x^4 - 3x^2 + 2.$$

The polynomial W is defined as the difference $W(x) = P(x) - Q(x)$.

Task 5.1 (0-1)

Complete the sentence so that it is true.

The general form of W is $W(x) = \dots$

Task 5.2 (0-1)

Decide whether the following statements are true or false. Select T if the statement is true or F if it is false.

| | | |
|--|----------|----------|
| Number 2 is the root of the polynomial W . | T | F |
| The factored form of the polynomial W is $W(x) = (x - 1)(x + 2)$. | T | F |

Task 6

A linear decreasing function f is given by the equation $f(x) = mx + (m^2 - 1)$, where m is a real number. The graph of function $y = f(x)$ in the Cartesian coordinate system (x, y) is a straight line that intersects the y -axis at point $(0, 3)$.

Task 6.1 (0-1)

Complete the sentence so that it is true.

The number m in the equation of the linear function f is equal to

Task 6.2 (0-1)

The area of the right angled triangle whose vertices are the points of intersection of the graph of the function f with the coordinate system axes and the origin $(0,0)$ is equal to

| NOTES | |
|-------|--|
| | |

Task 7 (0-1)

A linear function f is given by the equation $f(x) = (\sqrt{2} - 2)x + \sqrt{2}$.

Decide whether the following statements are true or false. Select T if the statement is true or F if it is false.

| | | |
|--|----------|----------|
| The function f is increasing. | T | F |
| The set of all real numbers that satisfy the inequality $f(x) > 2$ is the interval $(-\infty, -1)$. | T | F |

NOTES

Task 8.

A quadratic function f is given by the equation $f(x) = \frac{x^2}{3} + 2x - 9$.

Task 8.1 (0-2)

Finish the sentences. Select the correct answer from the option A-D and the correct answer from the options E-H.

1. The line of symmetry of the graph of the function f is a line given by the equation
A. $x = -6$ B. $x = -3$ C. $x = 3$ D. $x = 6$

2. The lowest value of the function f is
E. -12 F. -9 G. -3 H. 0

Task 8.2 (0-3)

Complete the sentences so that they are true.

1. The conditions $t < 0$ and $f(t) = f(2)$ are met when $t = \dots$.
 2. The zeroes of the function are numbers \dots .
 3. The set of all arguments for which the function f takes negative values is the interval \dots .

Task 9 (0-1)

An increasing geometric sequence (a_n) is defined for each natural positive number n . The tenth term of this sequence is equal to 9, and the eighth term is equal to 4.

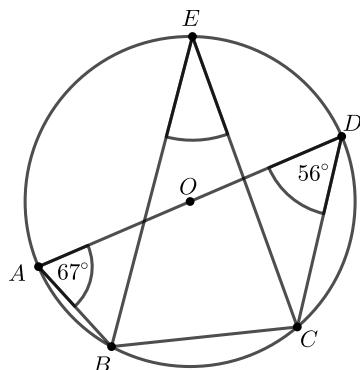
Finish the sentence. Select the correct answer from the options given below.

The common ratio of the sequence (a_n) is equal to

- A. $-\frac{9}{4}$ B. $-\frac{3}{2}$ C. $\frac{3}{2}$ D. $\frac{9}{4}$

Task 10 (0-1)

Five points A, B, C, D and E lie on a circle with centre O . The chord AD is the diameter of this circle. The angle BAD with the measure 67° is subtended by the arc BD , and the angle ADC with measure 56° is subtended by the arc AC (see the figure below).



Finish the sentence. Select the correct answer from the options given below.

The measure of the angle BEC subtended by the arc BC is

- A. 30° B. 31° C. 32° D. 33°

Task 11 (0-3)

The point $A = (2,7)$ is the vertex of a parallelogram $ABCD$, and point $S = (5,10)$ is the point of intersection of the diagonals of this parallelogram. The side AD of this parallelogram lies on the straight line given by the equation $y = 3x + 1$. The point $K(3,10)$ is the midpoint of the side AD .

Complete the sentences so that they are true.

1. The length of the diagonal AC of the parallelogram is equal to
 2. The distance between the center of the parallelogram $ABCD$ and the straight line AD
is equal to
 3. The equation of the perpendicular bisector of the segment AD is

Task 12 (0-1)

The teacher checked the math test and collected the results in the table below to analyze the statistic's data.

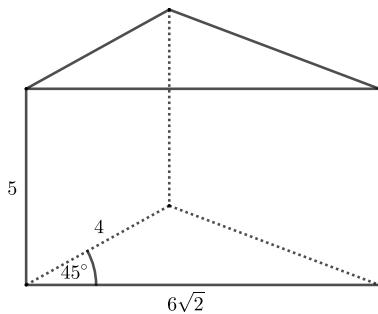
| | | | | | | |
|-----------|---|---|---|---|---|---|
| Score | 1 | 2 | 3 | 4 | 5 | 6 |
| Frequency | 0 | 2 | 3 | 9 | 5 | 1 |

Decide whether the following statements are true or false. Select T if the statement is true or F if it is false.

| | | |
|---|---|---|
| The arithmetic mean of the test scores is 4. | T | F |
| The standard deviation of the test scores is 1. | T | F |

Task 13 (0-1)

The base of a prism is a triangle. The lengths of two sides of this triangle are 4 cm and $6\sqrt{2}$ cm, and the angle between them is 45° . The height of the prism is 5.



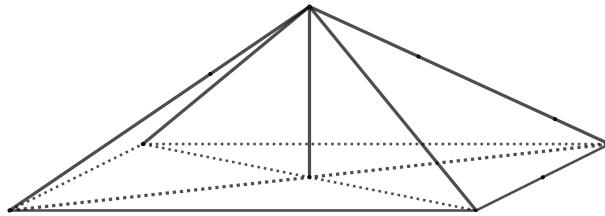
Finish the sentence. Select the correct answer from the options given below.

The volume of the prism is

- A. 60 cm^3 B. $60\sqrt{2} \text{ cm}^3$ C. 120 cm^3 D. $120\sqrt{2} \text{ cm}^3$

Task 14 (0-1)

In a regular quadrilateral pyramid the base has the area 300 cm^2 and the measure of the angle between a lateral edge and the base is 30° .



Finish the sentence. Select the correct answer from the options given below.

The height of the pyramid is

- A. $5\sqrt{2}$ cm B. $5\sqrt{3}$ cm C. $10\sqrt{2}$ cm D. $10\sqrt{3}$ cm

Task 15 (0-3)

There are 5 cups on the table, two of which have a hidden defect. The experiment involves selecting one cup from among the all five cups, and then selecting a second cup from among the four cups that left on the table.

Let A be the event that at least one of the two selected cups has a hidden defect.

Complete the sentences so that they are true.

1. The sample space of this experiment has elementary elements.
 2. The event A has elementary events.
 3. The probability of the event A is equal to