

UZUPEŁNIA ZDAJĄCY

KOD			PESEL											
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miejsce  
na naklejkę

**EGZAMIN MATURALNY  
Z MATEMATYKI  
POZIOM PODSTAWOWY  
DODATKOWE ZADANIA W JĘZYKU ANGIELSKIM**

DATA: **22 maja 2015 r.**

GODZINA ROZPOCZĘCIA: **09:00**

CZAS PRACY: **80 minut**

LICZBA PUNKTÓW DO UZYSKANIA: **30**

**Instrukcja dla zdającego**

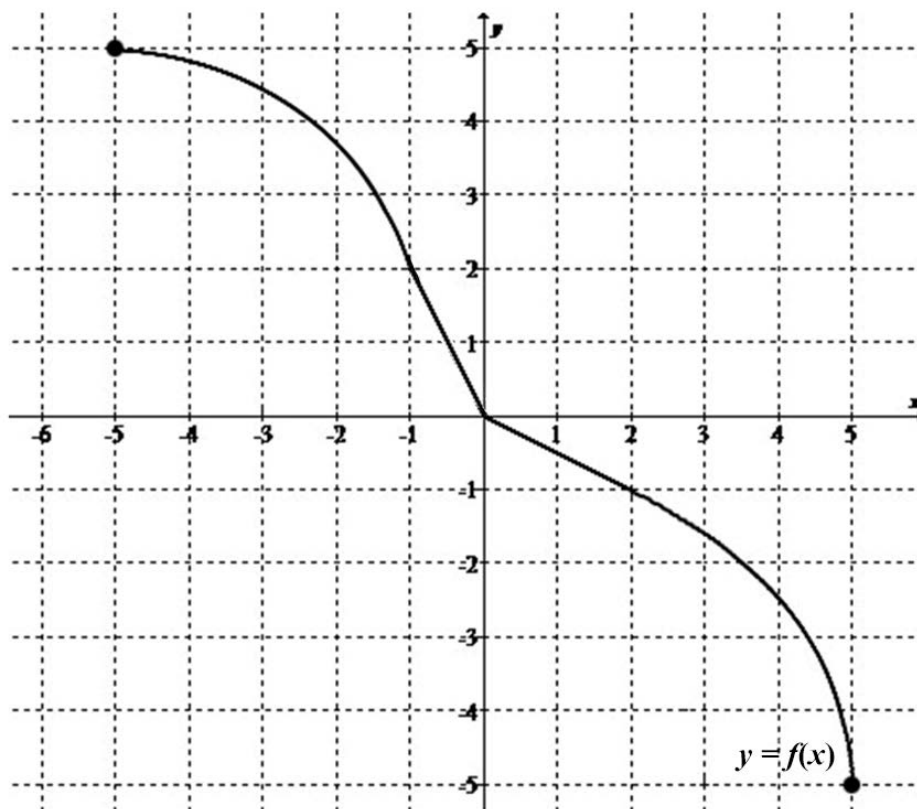
1. Sprawdź, czy arkusz egzaminacyjny zawiera 9 stron (zadania 1–17). Ewentualny brak zgłoś przewodniczącemu zespołu nadzorującego egzamin.
2. Rozwiązania i odpowiedzi zapisz w miejscu na to przeznaczonym przy każdym zadaniu.
3. Pisz czytelnie. Używaj długopisu/pióra tylko z czarnym tuszem/atramentem.
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.



MMA-R2\_1A-152

**Illustration for tasks 1–4**

The illustration shows the graph of a function  $f$ .

**Task 1 (0–1)**

The range of the function  $f$  belongs to the following interval:

- A.  $\langle -1, 2 \rangle$       B.  $\langle 0, 5 \rangle$       C.  $\langle -5, 5 \rangle$       D.  $\langle -5, 0 \rangle$

**Task 2 (0–1)**

The zero of the function  $f$  is

- A.  $x = -5$       B.  $x = 0$       C.  $x = 2$       D.  $x = 5$

**Task 3 (0–1)**

The set of solutions for the inequality  $f(x) \leq -1$  is the following interval:

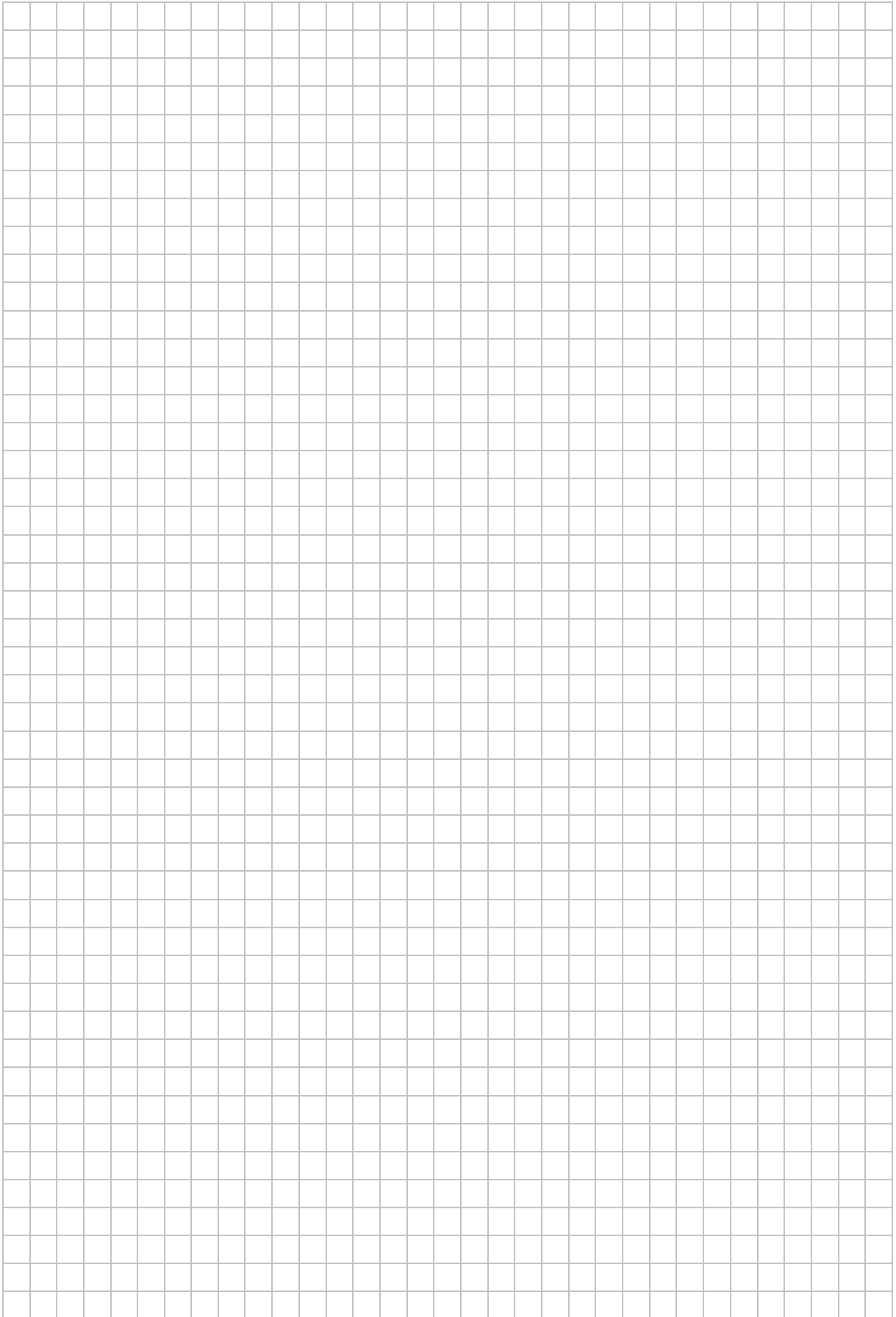
- A.  $\langle 2, 5 \rangle$       B.  $\langle -5, 2 \rangle$       C.  $\langle -5, -1 \rangle$       D.  $\langle -1, 5 \rangle$

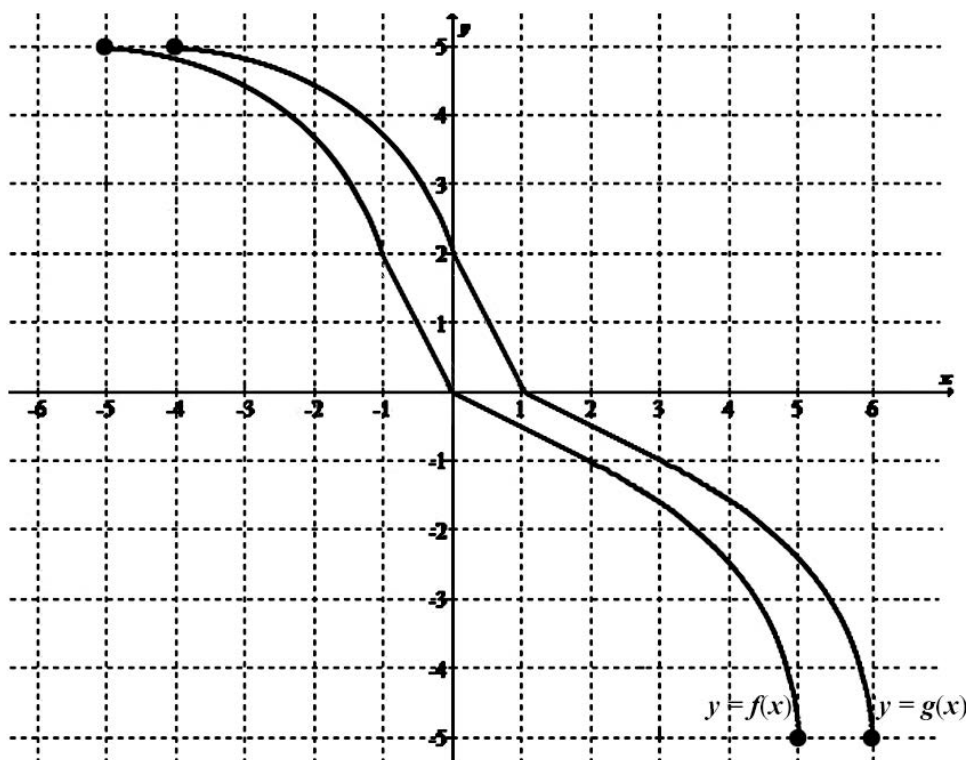
**Task 4 (0–1)**

The graph of the function  $f$  is symmetrical about

- A. the  $Ox$  axis      B. the  $Oy$  axis      C. the origin      D. the line  $y = x$

# NOTES



**Task 5 (0–1)**

The function  $g$  was plotted by translating the graph of the function  $f$  along one of the axes of the coordinate system (see illustration). The function  $g$  can be expressed in the following way:

- A.  $g(x) = f(x) - 1$     B.  $g(x) = f(x + 1)$     C.  $g(x) = f(x - 1)$     D.  $g(x) = f(x) + 1$

**Task 6 (0–1)**

The points  $K = (1, 3)$ ,  $L = (-3, 2)$ ,  $M = (-2, -2)$ ,  $N = (2, -1)$  are the vertices of a square. The area of the square is

- A.  $\sqrt{17}$                       B. 17                              C.  $\sqrt{34}$                       D. 34

**Task 7 (0–1)**

Let us assume that  $\frac{15}{16}$  is approximately equal to 0.9. The approximation error expressed as a percentage will be equal to

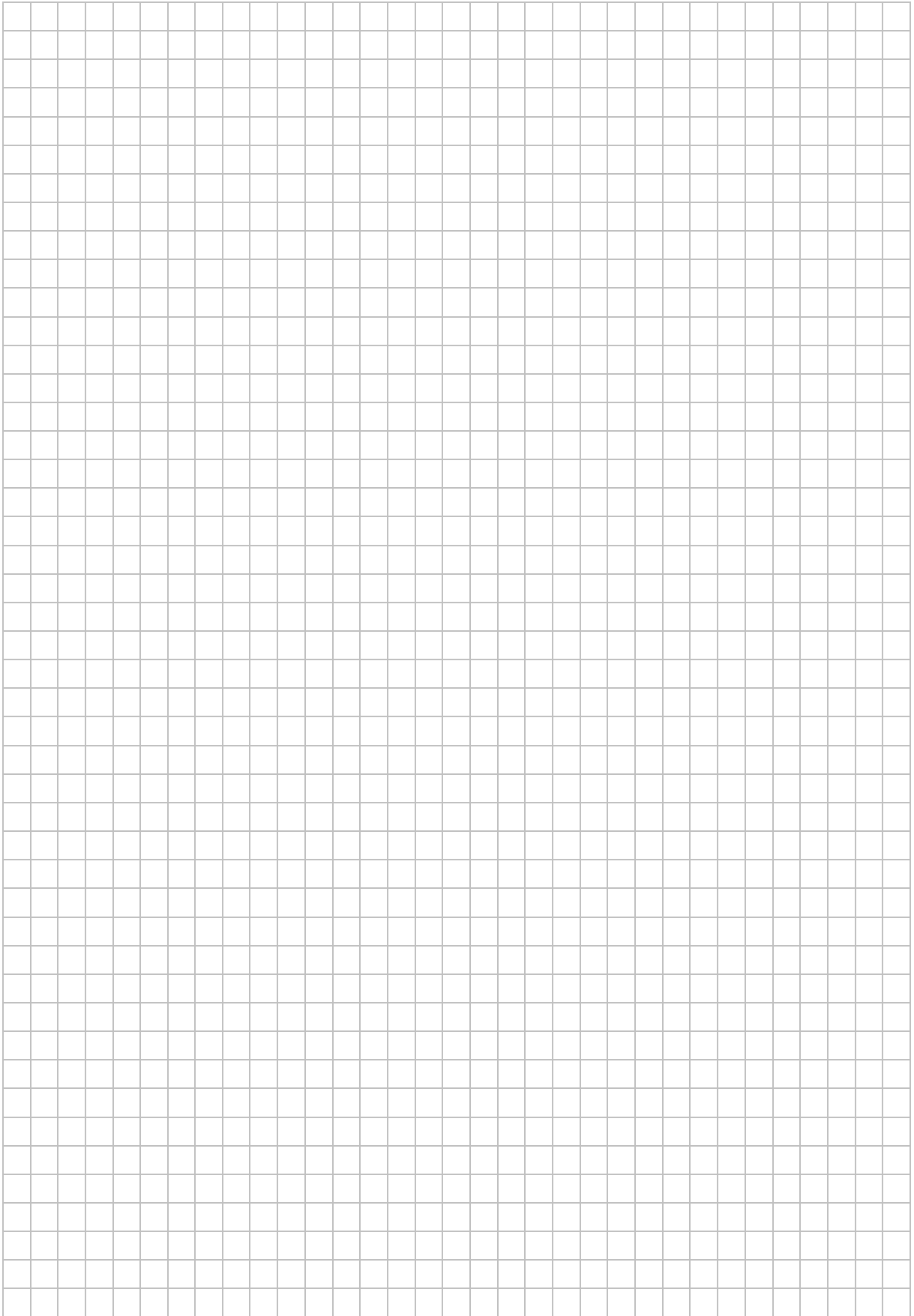
- A. 4%                              B. 0,04%                      C. 3%                              D. 0,03%

**Task 8 (0–1)**

The line  $k$  passes through the point  $S = (-3, 1)$  and is perpendicular to the line  $l$  with the equation  $y = -\frac{1}{3}x + 12$ . The line  $k$  has the following equation:

- A.  $y = -\frac{1}{3}x$                       B.  $y = 3x$   
 C.  $y = -\frac{1}{3}x - \frac{8}{3}$                       D.  $y = 3x + 10$

# NOTES



**Information for tasks 9–10.**

The acute angle of a rhombus is  $45^\circ$  and the area of the rhombus is  $100\sqrt{2}$ .

**Task 9 (0–1)**

The height of the rhombus is

- A.  $20\sqrt{2}$                       B. 20                      C.  $10\sqrt{2}$                       D. 10

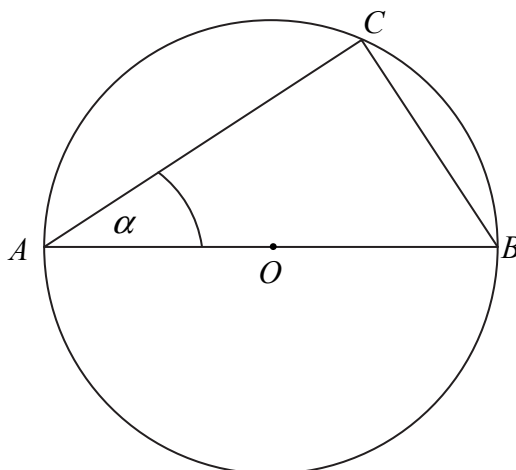
**Task 10 (0–1)**

The tangent of the obtuse angle of the rhombus is equal to

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

**Task 11 (0–1)**

The triangle  $ABC$  is circumscribed by a circle with a radius of 7 cm (see illustration). The center  $O$  of the circle lies on the side  $AB$ , and the cosine of the angle  $BAC$  is equal to  $\frac{2\sqrt{10}}{7}$ .



The length of the line segment  $BC$  is equal to

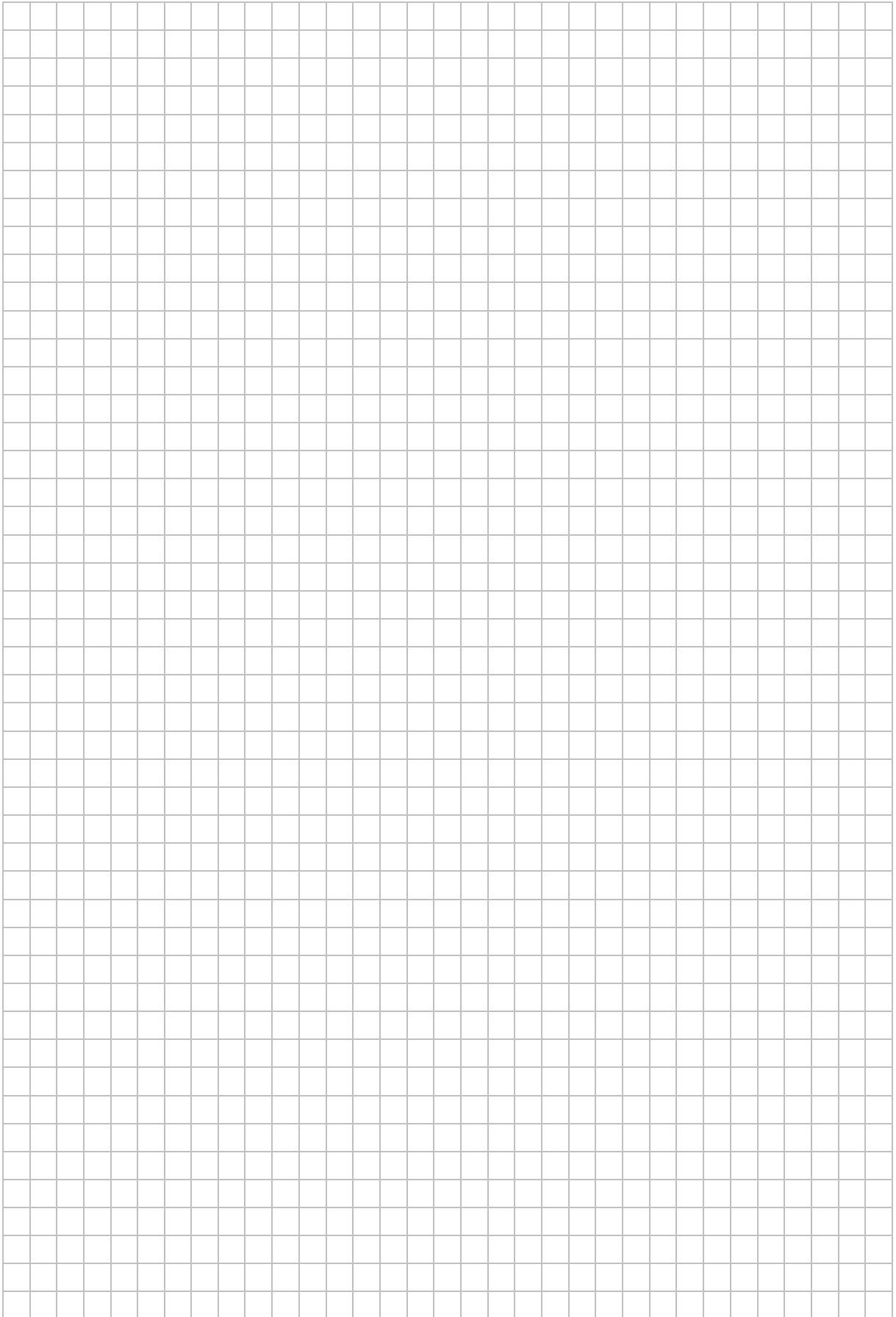
- A.  $\frac{\sqrt{10}}{49}$                       B. 6                      C.  $\frac{2\sqrt{10}}{49}$                       D. 3

**Task 12 (0–2)**

The sequence  $(a_n)$  is an arithmetic sequence defined for  $n \geq 1$ , with  $a_1 = -3$  and  $a_5 = 9$ . Complete the following sentences.

- a) The tenth term of the arithmetic sequence is equal to .....
- b) The sum of the first ten terms of the arithmetic sequence is equal to .....

# NOTES



**Task 13 (0–2)**

From the set of numbers  $\{1, 2, 3, \dots, 8\}$ , a single number is randomly drawn two times, without replacement. Complete the following sentences.

- Event  $A$  – the product of the two randomly drawn numbers is divisible by 5. This means that one of the randomly drawn numbers must be .....
- The probability of event  $A$  is equal to .....

**Task 14 (0–3)**

Given the function  $f$  with the formula  $f(x) = -x^2 - 2x + 3$ , complete the following sentences.

The function  $f$  reaches the maximum value of ..... for  $x$  equal to .....

The value of the function for  $x = -5$  is the same as for  $x$  equal to .....

The function  $f$  has negative values if, and only if, the  $x$  values belong to the set .....

**Task 15 (0–4)**

Write down each of the following as an algebraic expression.

- the cube of the sum of  $a$  and  $b$  .....
- the difference of  $a$  squared and  $b$  squared .....
- the quotient of the absolute value of  $a$  doubled and  $b$  .....
- the cube root of the absolute value of the quotient of  $a$  and  $b$  .....

**Task 16 (0–4)**

Given the numbers  $a = 24$ ,  $b = 60$ , complete the following sentences.

- The greatest common divisor of  $a$  and  $b$  is .....
- ..... is the lowest common multiple of  $a$  and  $b$ .
- The arithmetic mean of  $a$  and  $b$  is .....
- The largest prime number smaller than  $b$  is .....

**Task 17 (0–4)**

The lateral surface of a cylinder unfolds into a square with an area of  $72\pi$ . Complete the following sentences.

- The height of the cylinder is .....
- The radius of the cylinder's base is .....
- The area of the axial cross-section of the cylinder is .....
- The volume of the cylinder is .....



# NOTES

