Imię i nazwisko:
Klasa:
Grupa 2
Wynik:

Question 1 *(1 pt)*
The graph of $f(x) = \sqrt{x}$ has been first translated by a vector $[-1, -1]$ and then reflected in the x-axis to form a graph of $g(x)$. The equation of $g(x)$ is given by:

$$\text{A. } g(x) = \sqrt{-x-1} - 1 \qquad \text{B. } g(x) = \sqrt{-x+1} - 1$$

$$\text{C. } g(x) = -\sqrt{x+1} - 1 \qquad \text{D. } g(x) = -\sqrt{x+1} + 1$$

Question 2 *(1 pt)*
Consider a triangle ABC with $|AB| = 5$, $\angle ABC = 48°$ and $\angle BAC = 87°$. The radius of the circle circumscribing this triangle is equal to:

$$\text{A. } \frac{5\sqrt{2}}{2} \qquad \text{B. } 5 \qquad \text{C. } 5\sqrt{2} \qquad \text{D. } 10\sqrt{2}$$

Question 3 *(1 pt)*
Consider a parallelogram $ABCD$ with $A(3, 0), B(5, 4)$ and $D(2, 1)$. The coordinates of point C are:

$$\text{A. } (4, 4) \qquad \text{B. } (4, 5) \qquad \text{C. } (4, 6) \qquad \text{D. } (4, 7)$$

Question 4 *(1 pt)*
Point M with coordinates $(-\sqrt{2}, -1)$ is the mid-point of the line segment AB, where $A(-3\sqrt{2}, -4)$. Point B has coordinates:

$$\text{A. } (-5\sqrt{2}, -\tfrac{3}{2}) \qquad \text{B. } (-\sqrt{2}, -\tfrac{3}{2}) \qquad \text{C. } (\sqrt{2}, 2) \qquad \text{D. } (5\sqrt{2}, 6)$$

Question 5 *(1 pt)*
A circle has been inscribed in a square $ABCD$ with vertices $A(-2, 4), B(6, 4)$ and $C(6, 12)$. The centre of the circle has coordinates:

$$\text{A. } (2, 8) \qquad \text{B. } (4, 8) \qquad \text{C. } (2, 4) \qquad \text{D. } (4, 4)$$

Question 6 *(2 pts)*

Let $A(-2, 6)$ and $B(4, -12)$ find the coordinates of point P such that $\dfrac{|AP|}{|PB|} = \dfrac{2}{3}$

Question 7 *(3 pts)*

Consider the equation:

$$|2x^2 - 4x - 1| - 1 = 5 - m$$

Find the number of solutions to this equation depending on the parameter m.

Question 8 *(3 pts)*

Solve the inequality:

$$||x| - 1| \leqslant -x^2 + 1$$

Question 9 *(3 pts)*

Let $f(x)$ be a function with domain $(-3, 3)$ and range $(-4, 0)$.
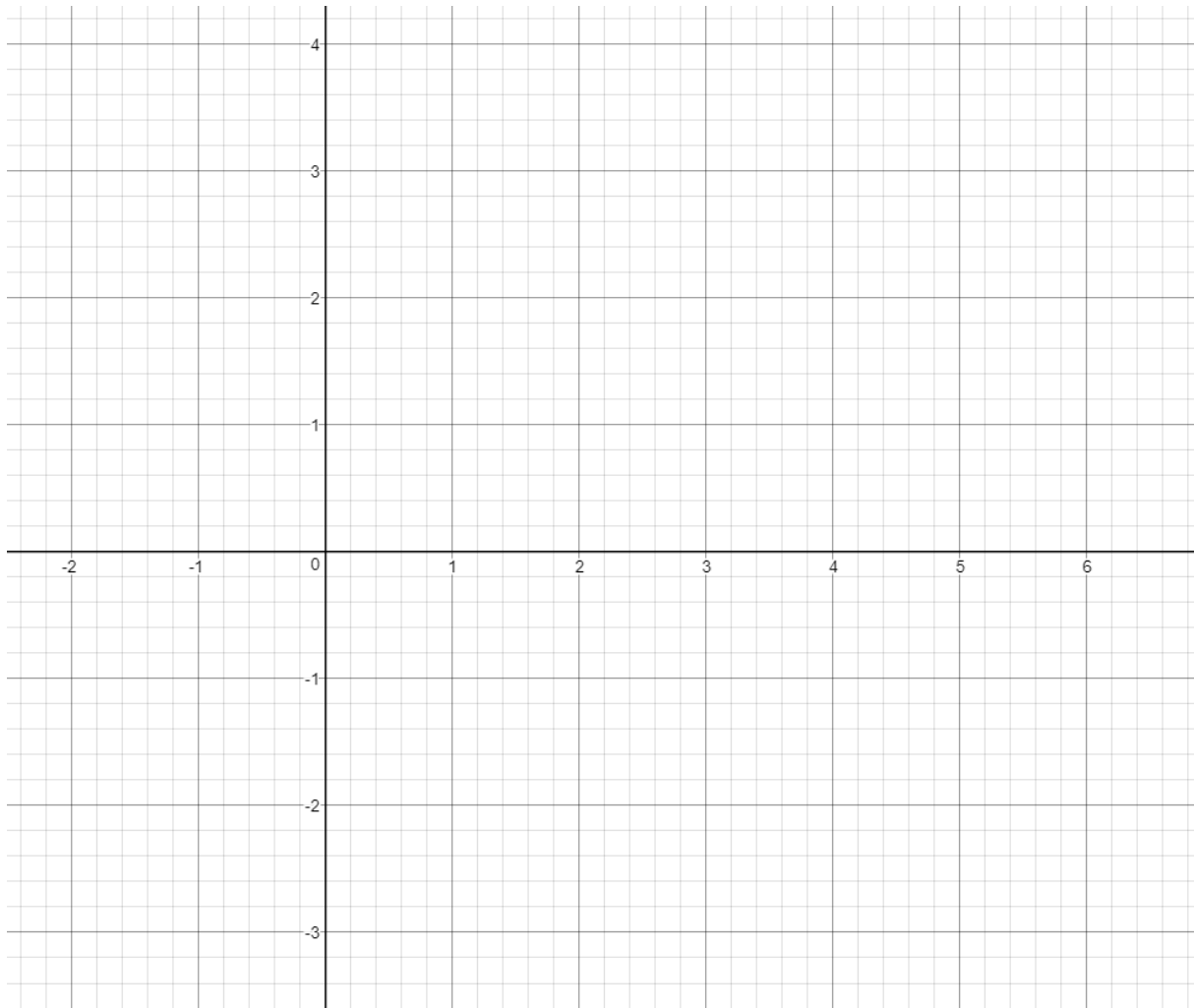Suppose that $f(2) = -3$, $f(1) = -4$, $f(0) = -2$ and $f(-1) = -1$.
Consider a function $g(x) = |f(-x - 1)| - 4$.

a) State the domain and range of $g(x)$.

b) Calculate $g(0)$.

c) Solve $g(x) = 0$.

Question 10 *(4 pts)*

Sketch the function

$$f(x) = \begin{cases} |x^3 + 1| & if \quad x < -1 \\ \frac{1}{x} + 1 & if \quad -1 \leqslant x < 2 \\ |x - 4| - \frac{1}{2} & if \quad x \geqslant 2 \end{cases}$$

Consider the equation:

$$f(x) = \log_8(m - 1)$$

Find the value(s) of m for which this equation has exactly 2 solutions.