Imię i nazwisko:
Klasa:
Grupa 1
Wynik:

**Question 1** *(1 pt)*
If the line $y = 2x + 3$ and $y = (m - 1)x + 2$ are parallel, then

A. $m = -0.5$     B. $m = 0.5$     C. $m = 2$     D. $m = 3$

**Question 2** *(1 pt)*
If $g(x) = f(x - 2) - 1$, then the graph of $g$ has been formed by translating the graph of $f$ by a vector:

A. $\begin{pmatrix} -2 \\ -1 \end{pmatrix}$     B. $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$     C. $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$     D. $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$

**Question 3** *(1 pt)*
For what values of $m$ is the function $f(x) = (3 - m)x + m$ increasing?

A. $m < 3$     B. $m < 0$     C. $m > 0$     D. $m > 3$

**Question 4** *(1 pt)*
Given points $A(1, -2)$ and $B(2, 2)$, what is the length of the vector $\overrightarrow{AB}$?

A. $1$     B. $5$     C. $\sqrt{17}$     D. $\sqrt{26}$

**Question 5** *(1 pt)*
For what value of $k$ the lines $y = 3x - 1$ and $y = -2x + k$ intercept the $x$-axis at the same point?

A. $k = -\frac{2}{3}$     B. $k = -\frac{1}{6}$     C. $k = \frac{1}{6}$     D. $k = \frac{2}{3}$

**Question 6** *(6 pts)*

Conider the triangle $ABC$ with $A(0,0)$, $B(4,2)$ and $C(2,10)$.

(a) Find the mid-points $M$, $N$, $P$ of the line segments $AB$, $BC$ and $CA$ respectively.

(b) Find the equation of lines $l_1$, $l_2$ and $l_3$ which contain the perpendicular bisectors of line segments $AB$, $BC$ and $CA$ respectively.

(c) Find the point of intersection $l_1$ and $l_2$.

(d) Show that this point of intersection also lies on $l_3$.

(e) Comment on your result.

## Question 7 *(4 pts)*

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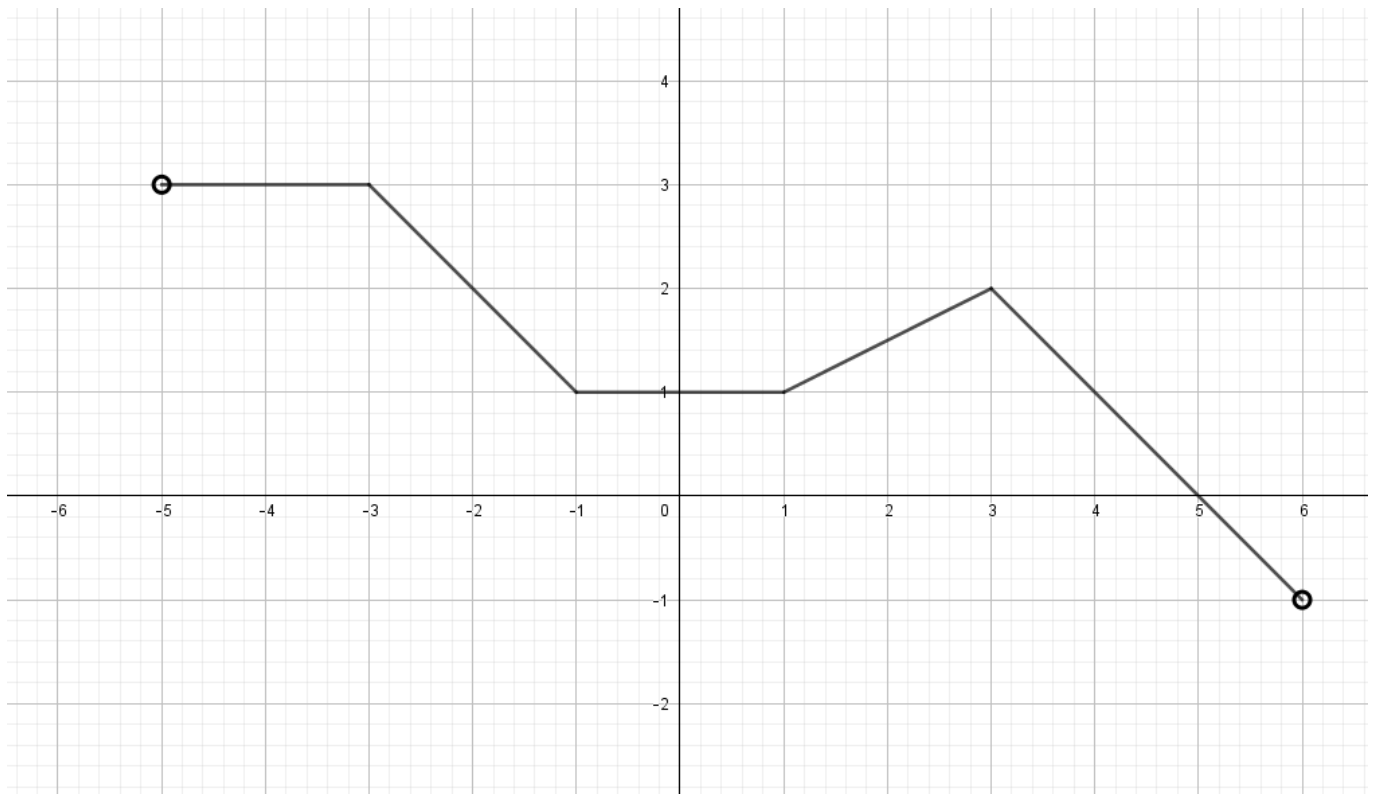


Let $g(x) = |f(2x) - 2| + 1$.

(a) Describe the sequence of transformations that turns the graph of $f$ into the graph of $g$.

(b) Draw the graph of $g$ on the same diagram.

## Question 8 *(5 pts)*

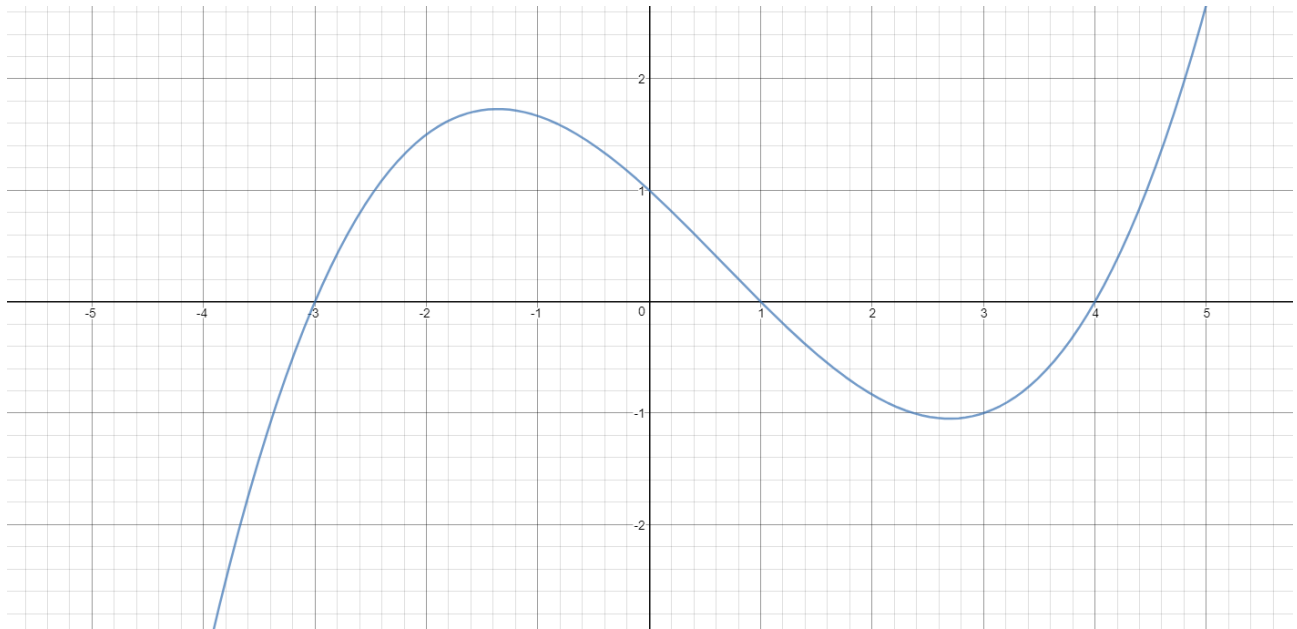Consider the functions $f(x) = \sqrt{x}$ and $g(x) = 3\left|\sqrt{|x| - 1} - 2\right|$.

(a) Describe the sequence of transformations that turns the graph of $f$ into the graph of $g$.

(b) Draw the graph of $g$ for $-10 \leqslant x \leqslant 10$ on the set of axes below.
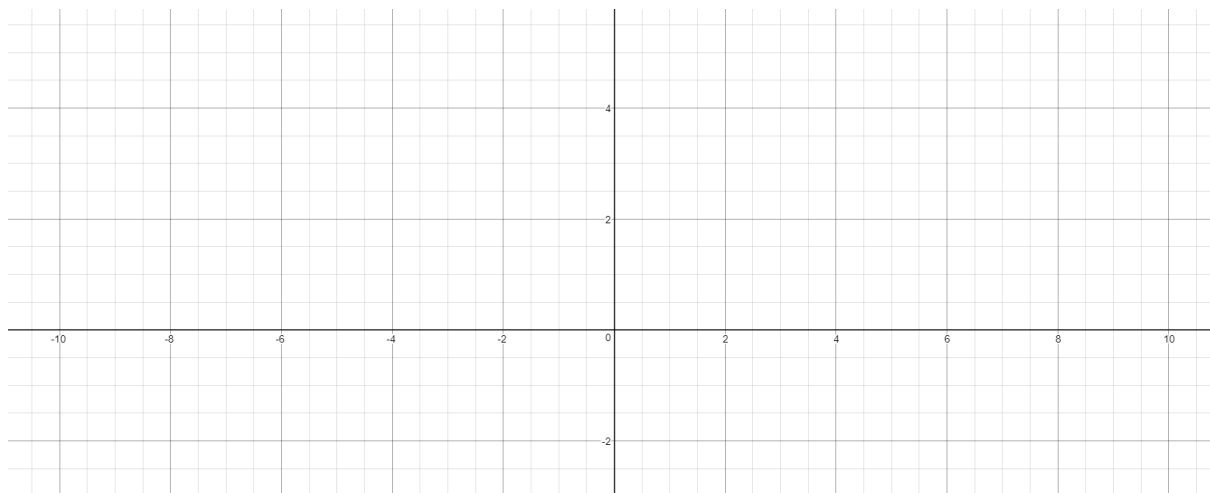


(c) Find the solutions to the equation $g(x) = 3$.

## Extra question

The graph of $f(x)$ is given below.



On the same diagram sketch the graph of $g(x) = \dfrac{1}{f(|x|)}$.