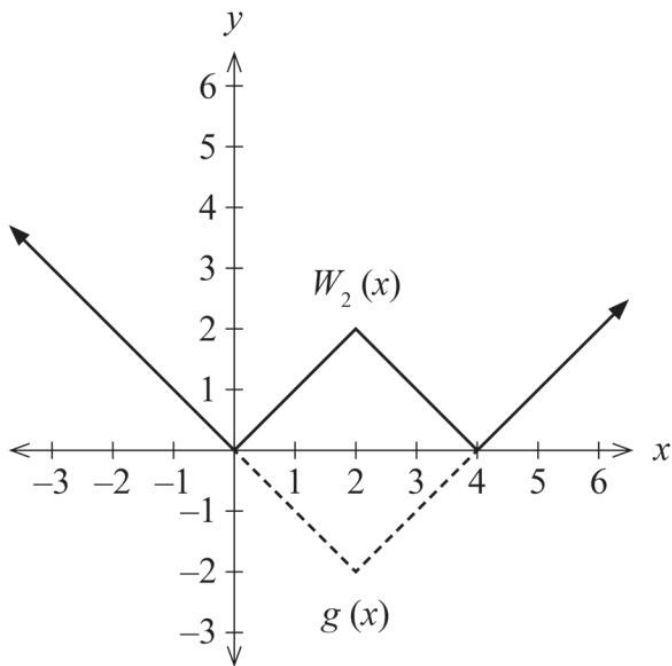


Question 15

(7 marks)

The graph of $W_k(x) = \left| \frac{k}{2} |x - k| - k \right|$ is called a W-graph where $k > 0$.

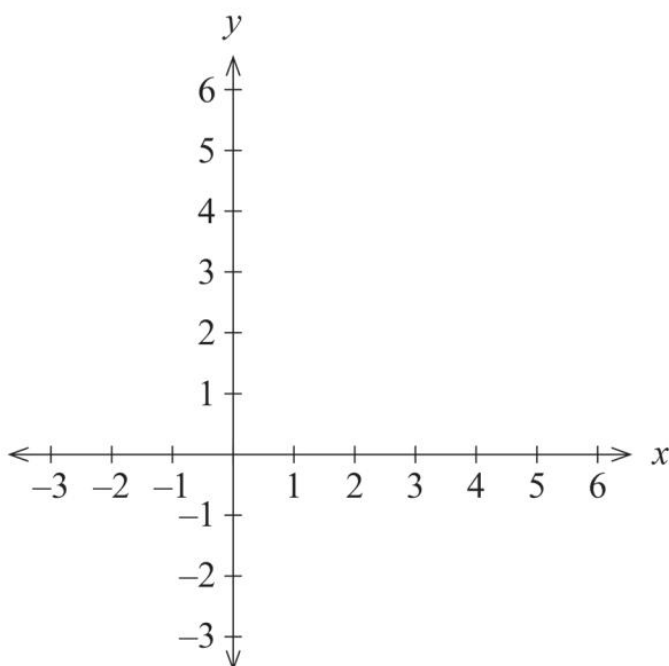
The graphs of $y = W_2(x)$ and $g(x) = |x - 2| - 2$ are shown below for $k = 2$.



(a) On the axes below, sketch $y = W_3(x)$ i.e. the W-graph for $k = 3$.

i.e. $W_3(x) = \left| \frac{3}{2} |x - 3| - 3 \right|$.

(2 marks)



- (b) Determine how many solutions the equation $W_k(x) = k$ will have. Justify your answer.
(2 marks)

- (c) By considering the general W-graph, develop an expression for $\int_{k-2}^{k+2} W_k(x) dx$ in terms of the constant k .
(3 marks)