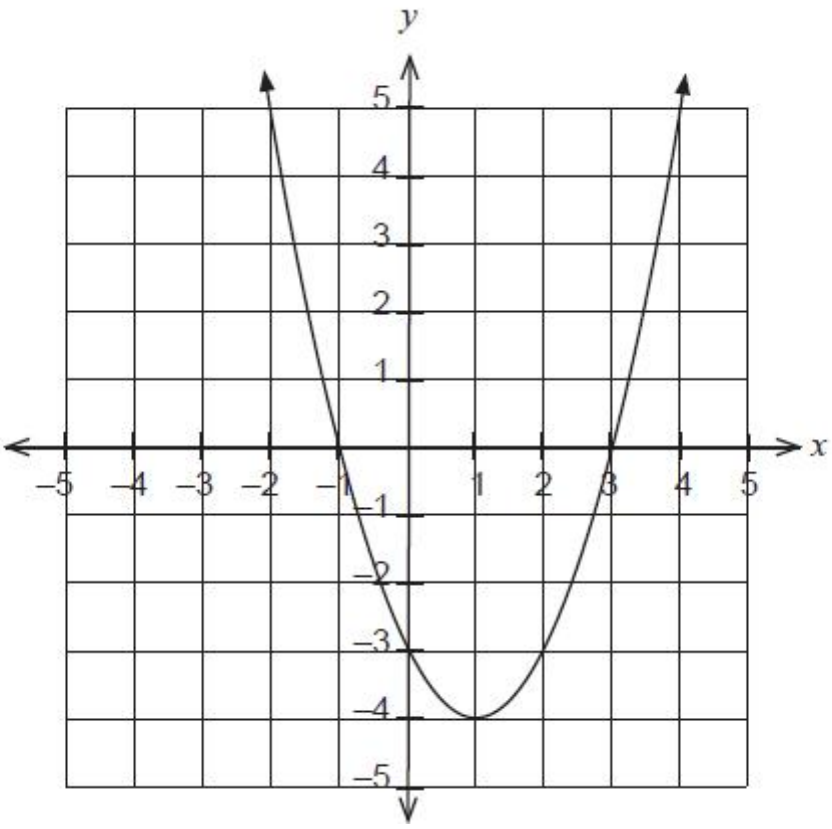
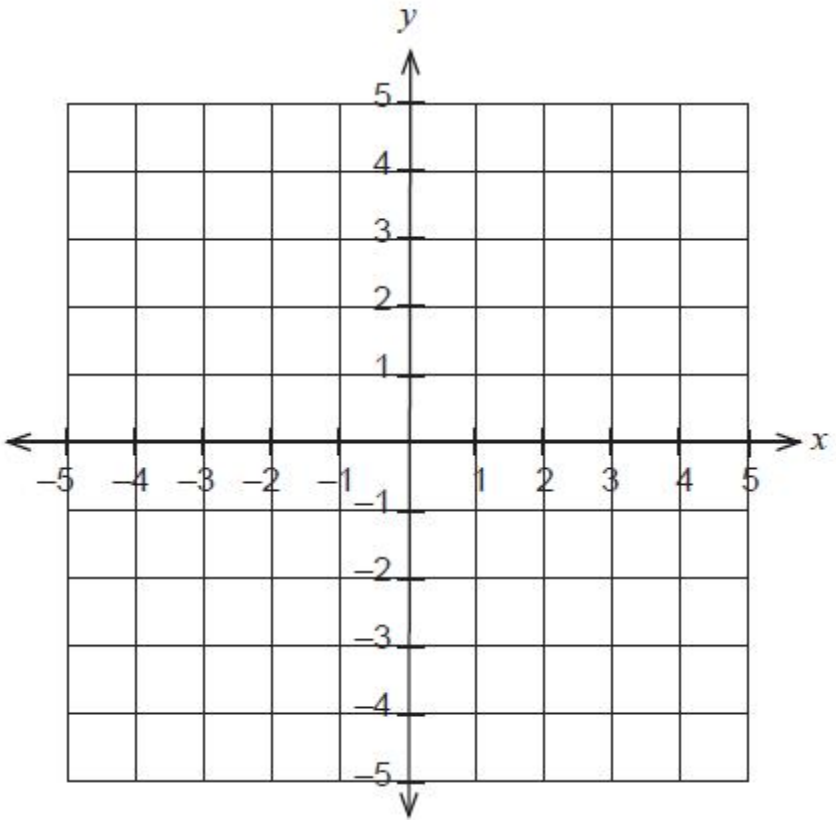
Question 8 **(11 marks)**

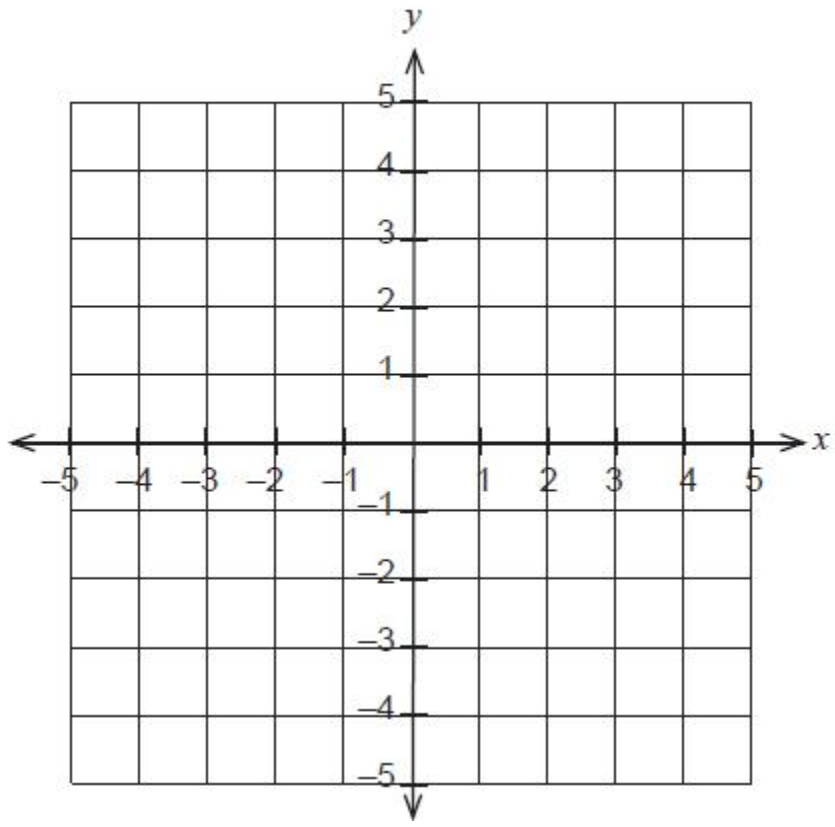
The graph of $f(x) = (x-1)^2 - 4$ is shown below.



(a) Sketch the graph of $y = \dfrac{1}{f(x)}$ on the coordinate axes below. (4 marks)



(b) Sketch the graph of $y = f(|x|)$ on the coordinate axes below. (2 marks)



(c) The domain of function f is restricted to $x \leq k$ so that $y = f^{-1}(x)$ is a function. If this restricted domain represents the largest possible domain, state the value for the constant k. Explain. (2 marks)

(d) Using the restriction $x \leq k$, determine the defining rule for $y = f^{-1}(x)$.
Also state the domain for $y = f^{-1}(x)$. (3 marks)