

9 Functions f and g are defined for $x \in \mathbb{R}$ by

$$f : x \mapsto \frac{1}{2}x - 2,$$

$$g : x \mapsto 4 + x - \frac{1}{2}x^2.$$

(i) Find the points of intersection of the graphs of $y = f(x)$ and $y = g(x)$. [3]

This image shows a full page of white paper with ten horizontal dashed lines, evenly spaced from top to bottom. These lines are typical of primary-ruled notebook paper used for teaching handwriting or basic writing skills. There are no margins, text, or other markings on the page.

(ii) Find the set of values of x for which $f(x) > g(x)$. [2]

[illegible]

- (iii) Find an expression for $fg(x)$ and deduce the range of fg .

[4]

[illegible]

The function h is defined by $h : x \mapsto 4 + x - \frac{1}{2}x^2$ for $x \geq k$.

- (iv)** Find the smallest value of k for which h has an inverse.

[2]

[illegible]