



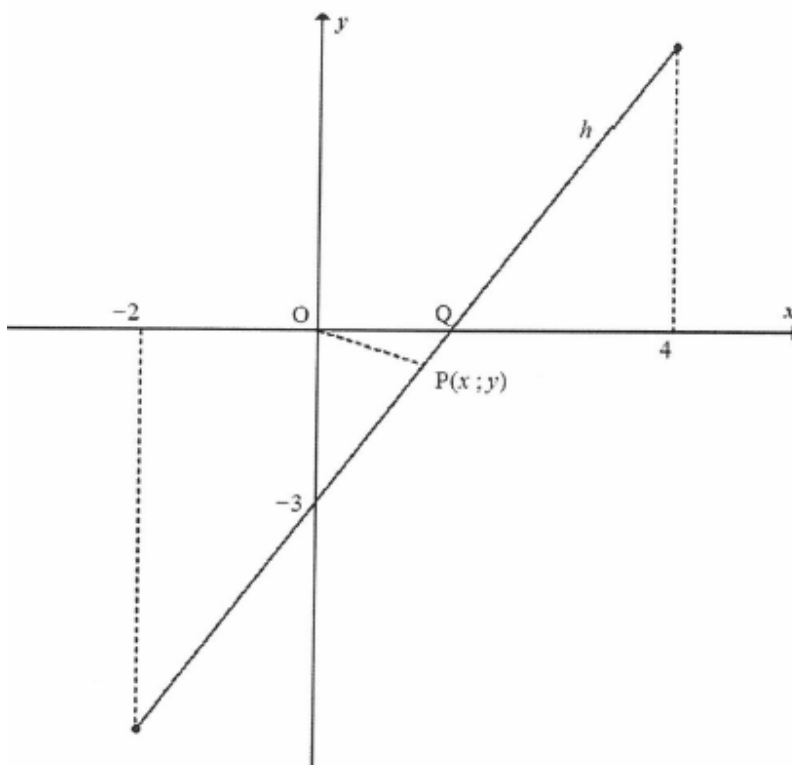
## Spring School Functions

1. Sketch the graph  $y = x - 1$ . Give the domain and range and say whether it is a one-to-one or many-to-one function.
2. Sketch the graph  $y = x^2 - 2x - 3$ . Give the domain and range and say whether it is a one-to-one or many-to-one function.
3. Consider:  $f(x) = x^2 - 4$ 
  - a) Find an equation for the inverse (restrict the domain if necessary)
  - b) Give the domain and range of the inverse.
  - c) Sketch the graphs  $y = f(x)$  (or the restriction),  $y = x$  and the inverse on the same system of axes
4. Consider:  $f(x) = 4 - (x + 2)^2$ 
  - a) Find an equation for the inverse (restrict the domain if necessary)
  - b) Give the domain and range of the inverse.
  - c) Sketch the graphs (or the restriction), and the inverse on the same system of axes
5. Consider:  $f(x) = \frac{6}{x-2} + 3$ 
  - a) Write down the equations of the asymptotes of the graph of  $f$ .
  - b) Write down the domain of  $f$ .
  - c) Draw a sketch graph of  $f$  in your ANSWER BOOK, indicating the intercept(s) with the axes and the asymptotes.
  - d) The graph of  $f$  is translated to  $g$ . Describe the transformation in the form  $(x; y) \rightarrow \dots$  if the axes of symmetry of  $g$  are  $y = x + 3$  and  $y = -x + 1$ .
6. Consider the function  $f(x) = 3 \cdot 2^x - 6$ 
  - a) Calculate the coordinates of the  $y$ -intercept of the graph of  $f$ .
  - b) Calculate the coordinates of the  $x$ -intercept of the graph of  $f$ .
  - c) Sketch the graph of  $f$  in your ANSWER BOOK.  
Clearly show ALL asymptotes and intercepts with the axes.
  - d) Write down the range of  $f$ .
7. Given the function  $f(x) = 2^{x+1} - 8$ 
  - a) Write down the equation of the asymptote of  $f$ .
  - b) Sketch the graph of  $f$ . Clearly indicate all intercepts with the axes as well as the asymptotes.
  - c) The graph of  $g$  is obtained by reflecting the graph of  $f$  in the  $y$  axis. Write down the equation of  $g$
8. Given  $h(x) = 2x - 3$  for  $-2 \leq x \leq 4$ . The  $x$ -intercept of  $h$  is  $Q$ .
  - a) Determine the coordinates of  $Q$
  - b) Write down the domain of  $h^{-1}$



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- c) Sketch the graph of  $h^{-1}$  in your answer book clearly indicating the  $y$  intercept and the end points.
- d) For which values of  $x$  will  $h(x) = h^{-1}(x)$ ?



9. Consider:  $g(x) = 2x^2 - 8$
- Draw a sketch graph of  $g(x)$
  - State the domain and range of  $g(x)$
  - Determine the equation of the inverse of  $g$  in the form  $g^{-1}(x) = \dots$
  - Sketch the graph of  $g^{-1}(x)$ , showing all intercepts with the axes.
  - State the domain and range of  $g^{-1}(x)$ .
10. The graph of  $h(x) = ax^2, x \leq 0$  is sketched below and the point  $(-4; -8)$  lies on the graph of  $h$ .
- Determine the value of  $a$ .
  - Determine the equation of the inverse of  $h(x)$  in the form  $h^{-1}(x) = \dots$



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- c) Write down the range of  $h^{-1}$
- d) Sketch the graph of  $h^{-1}$  showing one point on the graph other than the origin.
- e) The graph of  $h(x)$  is reflected about the line  $y = x$  and is then reflected across the x-axis.  
Determine the equation of the new function in the form  $y = \dots$