

**Exercise 71**

- a. Graph the functions  $f(x) = x/2$  and  $g(x) = 1 + (4/x)$  together to identify the values of  $x$  for which

$$\frac{x}{2} > 1 + \frac{4}{x}.$$

- b. Confirm your findings in part (a) algebraically.

**Solution**

The aim is to find the values of  $x$  for which  $f(x) > g(x)$ .

$$f(x) > g(x)$$

$$\frac{x}{2} > 1 + \frac{4}{x}$$

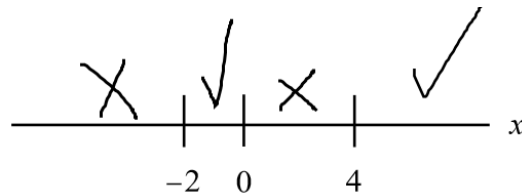
$$\frac{x}{2} - \frac{4}{x} - 1 > 0$$

$$\frac{x^2}{2x} - \frac{8}{2x} - \frac{2x}{2x} > 0$$

$$\frac{x^2 - 2x - 8}{2x} > 0$$

$$\frac{(x - 4)(x + 2)}{2x} > 0 \tag{1}$$

The critical points are  $x = 4$ ,  $x = -2$ , and  $x = 0$ . Partition the number line at these values of  $x$  and test a number within each interval to see if inequality (1) is true or false.



Therefore, the values of  $x$  for which  $f(x) > g(x)$  are

$$\{x \mid -2 < x < 0, x > 4\}.$$

This is confirmed in the graph of the two functions versus  $x$ .

