

- 9 (a) Describe a sequence of **two** transformations which maps the graph with equation

$$y = \frac{1}{x}$$

onto the graph with equation

$$y = \frac{3}{x-4}$$

[2 marks]

- 9 (b) State the equation of the vertical asymptote of the graph with equation

$$y = \frac{3}{x-4}$$

[1 mark]

- 9 (c) A student is attempting to use a change of sign to determine if the equation

$$\frac{3}{x-4} = x$$

has a solution between 3 and 5

The student **correctly** writes

$$\frac{3}{x-4} = x \Leftrightarrow \frac{3}{x-4} - x = 0$$

$$\text{Let } f(x) = \frac{3}{x-4} - x$$

$$f(3) = -6 < 0 \text{ and } f(5) = -2 < 0$$

The student then **incorrectly** states:

"Since there is no change of sign, there is no solution between 3 and 5"

Give two reasons why the student's argument is invalid.

[2 marks]

Reason 1: _____

Reason 2: _____