Advanced Higher Maths
SQA 2016 Specimen
Question 13

Consider the curve in the (x, y) plane defined by the equation $y = \dfrac{4x-3}{x^2-2x-8}$.

(a) Identify the vertical asymptotes to this curve and justify your answer. **2**

Here are two statements about the curve:

(1) It does not cross or touch the x-axis.

(2) The line $y = 0$ is an asymptote.

(b) (i) State why statement (1) is false.

(ii) Show that statement (2) is true. **3**

Answers:

(a) $x = 4$ and $x = -2$ because $y \to \pm\infty$ as $x \to 4$ and $x \to -2$.

(b) (i) The statement is false because the graph meets the x-axis when $x = \frac{3}{4}$.

(ii) As $x \to \pm\infty, f(x) \to 0$ so the line $y = 0$ is a horizonal asymptote.