Rational Functions Exam Questions Sheet 2

Q1.

Express

$$\frac{2(3x+2)}{9x^2-4} - \frac{2}{3x+1}$$

as a single fraction in its simplest form.

(4)

(Total 4 marks)

Q2.

Express $\frac{4x}{x^2-9} - \frac{2}{x+3}$ as a single fraction in its simplest form.

(4)

(Total for question = 4 marks)

Q3.

Express

$$\frac{3x+5}{x^2+x-12} - \frac{2}{x-3}$$

as a single fraction in its simplest form.

(4)

(Total 4 marks)

Q4.

Express

$$\frac{x+1}{3x^2-3} - \frac{1}{3x+1}$$

as a single fraction in its simplest form.

(4)

(Total 4 marks)

Q5.

h(x) = $\frac{2}{x+2}+\frac{4}{x^2+5}-\frac{18}{(x^2+5)(x+2)}$, $x \geq 0$

Show that h(x) = $\frac{2x}{x^2+5}$

(4)

(Total 4 marks)

Q6.

The function f is defined by

$$f: x \mapsto \frac{2(x-1)}{x^2-2x-3}-\frac{1}{x-3}, \quad x>3.$$

Show that f(x) = $\frac{1}{x+1}$ for $x > 3$.

(4)

(Total 4 marks)

Q7.

The function f is defined by

$$f: x \mapsto \frac{3(x+1)}{2x^2+7x-4}-\frac{1}{x+4}, \quad x \in \mathbb{R}, x>\frac{1}{2}$$

Show that f (x) = $\frac{1}{2x-1}$

(4)

Q8.

(a) Simplify fully

$$\frac{2x^2+9x-5}{x^2+2x-15}$$

(3)

Given that

$$\ln(2x^2+9x-5)=1+\ln(x^2+2x-15), \quad x \neq -5,$$

(b) find x in terms of e.

(4)

(Total 7 marks)