QUESTION 5 (8 marks)

(a) Use mathematical induction to prove that:

$$\frac{1}{4\times 1^2-1}+\frac{1}{4\times 2^2-1}+\ldots+\frac{1}{4\times n^2-1}=\frac{n}{2n+1}$$, where n is a positive integer.

(6 marks)

(b) Hence find, in simplest rational form, the value of $\frac{1}{15}+\frac{1}{35}+\ldots+\frac{1}{399}$.

(2 marks)