7 a and b are two positive irrational numbers.

The sum of a and b is rational.

The product of a and b is rational.

Caroline is trying to prove $\frac{1}{a}+\frac{1}{b}$ is rational.

Here is her proof:

Step 1	$\frac{1}{a}+\frac{1}{b}=\frac{2}{a+b}$
Step 2	2 is rational and $a+b$ is non-zero and rational.
Step 3	Therefore $\frac{2}{a+b}$ is rational.
Step 4	Hence $\frac{1}{a}+\frac{1}{b}$ is rational.

7 (a) (i) Identify Caroline's mistake.

[1 mark]

7 (a) (ii) Write down a correct version of the proof.

[2 marks]

7 (b) Prove by contradiction that the difference of any rational number and any irrational number is irrational.

[4 marks]