

**Question 8**

- (i) Determine all primitive Pythagorean triples (if any) in which one of the sides is

(a) 14;

(b) 16.

[4]

- (ii) Of the two numbers 610 and 620 one can be written as a sum of two squares while the other cannot. Explain why the one cannot be expressed in this way and write the other as a sum of two squares.

[3]

- (iii) Suppose that  $\sqrt{7} = \frac{m}{n}$ , where  $m$  and  $n$  are positive integers. Deduce that

$$\sqrt{7} = \frac{7n - 2m}{m - 2n}$$

and show how the method of infinite descent can be used to deduce from this that  $\sqrt{7}$  is irrational.

[4]