

6 (a) Asif notices that  $24^2 = 576$  and  $2 + 4 = 6$  gives the last digit of 576

He checks two more examples:

$$27^2 = 729$$

$$2 + 7 = 9$$

Last digit 9

$$29^2 = 841$$

$$2 + 9 = 11$$

Last digit 1

Asif concludes that he can find the last digit of any square number greater than 100 by adding the digits of the number being squared.

Give a counter example to show that Asif's conclusion is **not** correct.

[2 marks]

6 (b) Claire tells Asif that he should look only at the last digit of the number being squared.

$$27^2 = 729$$

$$7^2 = 49$$

Last digit 9

$$24^2 = 576$$

$$4^2 = 16$$

Last digit 6

Using Claire's method determine the last digit of  $23456789^2$

[1 mark]

6 (c) Given Claire's method is correct, use proof by exhaustion to show that no square number has a last digit of 8

[2 marks]