

1. Find the sum of the arithmetic series

$$17 + 27 + 37 + \dots + 417.$$

(Total 4 marks)

2. A theatre has 20 rows of seats. There are 15 seats in the first row, 17 seats in the second row, and each successive row of seats has two more seats in it than the previous row.

- (a) Calculate the number of seats in the 20<sup>th</sup> row.  
(b) Calculate the **total** number of seats.

(Total 6 marks)

3. **Throughout this question all the numerical answers must be given correct to the nearest whole number.**

Park School started in January 2000 with 100 students. Every full year, there is an increase of 6 % in the number of students.

- (a) Find the number of students attending Park School in

- (i) January 2001;  
(ii) January 2003.

(4)

- (b) Show that the number of students attending Park School in January 2007 is 150.

(2)

Grove School had 110 students in January 2000. Every full year, the number of students is 10 more than in the previous year.

- (c) Find the number of students attending Grove School in January 2003.

(2)

- (d) Find the year in which the number of students attending Grove School will be first 60 % **more than** in January 2000.

(4)

Each January, one of these two schools, the one that has more students, is given extra money to spend on sports equipment.

- (e) (i) Decide which school gets the money in 2007. Justify your answer.  
(ii) Find the first year in which Park School will be given this extra money.

(5)

(Total 17 marks)

4. Portable telephones are first sold in the country *Cellmania* in 1990. During 1990, the number of units sold is 160. In 1991, the number of units sold is 240 and in 1992, the number of units sold is 360.

In 1993 it was noticed that the annual sales formed a geometric sequence with first term 160, the 2nd and 3rd terms being 240 and 360 respectively.

- (a) What is the common ratio of this sequence? (1)

Assume that this trend in sales continues.

- (b) How many units will be sold during 2002? (3)

- (c) In what year does the number of units sold first exceed 5000? (4)

Between 1990 and 1992, the total number of units sold is 760.

- (d) What is the total number of units sold between 1990 and 2002? (2)

During this period, the total population of *Cellmania* remains approximately 80 000.

- (e) Use this information to suggest a reason why the geometric growth in sales would not continue.

(1)

(Total 11 marks)