1. The tuition fees for the first three years of high school are given in the table below.

Year	Tuition fees (in dollars)
1	2000
2	2500
3	3125

These tuition fees form a geometric sequence.

(a) Find the common ratio, r, for this sequence.

(b) If fees continue to rise at the same rate, calculate (to the nearest dollar) the total cost of tuition fees for the first six years of high school.

(Total 4 marks)

2. The population of Bangor is growing each year. At the end of 1996, the population was 40 000. At the end of 1998, the population was 44 100. Assuming that these annual figures follow a geometric progression, calculate

(a) the population of Bangor at the end of 1997;

(b) the population of Bangor at the end of 1992.

(Total 4 marks)

3. The population of big cats in Africa is increasing at a rate of 5 % per year. At the beginning of 2004 the population was 10 000.

(a) Write down the population of big cats at the beginning of 2005.

(1)

(b) Find the population of big cats at the beginning of 2010.

(2)

(c) Find the number of years, from the beginning of 2004, it will take the population of big cats to exceed 50 000.

(3)
(Total 6 marks)

4. A teacher earns an annual salary of 45 000 USD for the first year of her employment Her annual salary increases by 1750 USD each year.

(a) Calculate the annual salary for the fifth year of her employment.

(3)

She remains in this employment for 10 years.

(b) Calculate the **total** salary she earns in this employment during these 10 years.

(3)

(Total 6 marks)

5. A tree begins losing its leaves in October. The number of leaves that the tree loses each day increases by the same number on each successive day.

Date in October	1	2	3	4	.....
Number of leaves lost	24	40	56	72	.....

(a) Calculate the number of leaves that the tree loses on the 21st October.

(3)

(b) Find the total number of leaves that the tree loses in the 31 days of the month of October.

(3)

(Total 6 marks)

6. Two students Ann and Ben play a game. Each time Ann passes GO she receives \$15. Each time Ben passes GO he receives 8% of the amount he already has. Both students start with \$100.

(a) How much money will Ann have after she has passed GO 10 times?

(b) How much money will Ben have after he passes GO 10 times?

(c) How many times will the students have to pass GO for Ben to have more money than Ann?

(Total 6 marks)

7. A National Lottery is offering prizes in a new competition. The winner may choose one of the following.

Option one: \$1000 each week for 10 weeks.

Option two: \$250 in the first week, \$450 in the second week, \$650 in the third week, increasing by \$200 each week for a total of 10 weeks.

Option three: \$10 in the first week, \$20 in the second week, \$40 in the third week continuing to double for a total of 10 weeks.

8. 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)

9. Ann and John go to a swimming pool.
They both swim the first length of the pool in 2 minutes.
The time John takes to swim a length is 6 seconds more than he took to swim the previous length.
The time Ann takes to swim a length is 1.05 times that she took to swim the previous length.

(a) (i) Find the time John takes to swim the third length.

(ii) Show that Ann takes 2.205 minutes to swim the third length.

(3)

(b) Find the time taken for Ann to swim a total of 10 lengths of the pool.

(3)
(Total 6 marks)

(a) Calculate the amount you receive in the tenth week, if you select

(i) **option two**;

(ii) **option three**.

(6)

(b) What is the total amount you receive if you select **option two**?

(2)

(c) Which option has the greatest total value? Justify your answer by showing all appropriate calculations.

(4)
(Total 12 marks)

10. A woman deposits \$100 into her son's savings account on his first birthday. On his second birthday she deposits \$125, \$150 on his third birthday, and so on.

(a) How much money would she deposit into her son's account on his 17th birthday?

(b) How much in total would she have deposited after her son's 17th birthday?

(Total 4 marks)