Arithmetic Growth Applications

1. How many multiples of 5 are there from 15 to 450, inclusive?

2. The 18^{th} term of an arithmetic sequence is 262. The common difference is 15. What is the first term of the sequence?

3. Comets approach the Earth at regular intervals. Comet Finlay is expected to reach its closest point to the earth in 2009, 2037 and three times between these years. In which years between 2009 and 2037 will Finlay reach its closest point to the Earth?

4. A theatre has 30 seats in the front row, 31 seats in the second row, 32 seat in the third row, and so on. If there are 20 rows of seats, how many seats are there?

5. Michelle is a marine biologist. She accepted a job that pays $46 850 in the first year and $56 650 in the eighth year. Her salary is an arithmetic sequence with eight terms.

   a) What raise can Michelle expect each year?
   b) What will her salary be in the sixth year?
   c) In what year will her salary first exceed $50 000?
   d) What is the total amount that Michelle will earn in the eight years?

6. An object dropped from the same height as the Alberta Stock Exchange building in Calgary takes about 5 s to hit the ground. The object falls 4.9 m in the first second, 14.7 m in the second second, 24.5 m in the third second, and so on. How tall is the building?

7. A clothing store ordered 300 sweaters and sold 20 of them at $100 each in the first week. In the second week, the selling price was lowered by $10, and 40 sweaters were sold. In the third week, the selling price was lowered by another $10, and 60 sweaters were sold. If the pattern continued:

   a) How many weeks did it take to sell the sweaters?
   b) What was the selling price the final week?