1. Determine whether the reasoning in the following examples is inductive or deductive.
   a. It has rained every day for the past 5 days and it is raining today as well. So it will also rain tomorrow.
   b. Josh has 95 baseball cards. His sister gave him 20 more on his birthday. Therefore he now has 115 baseball cards.
   c. All men are mortal. Socrates is a man. Therefore Socrates is mortal.
   d. In the sequence 5, 10, 15, 20 ..... The most probable next number is 25.

2. Identify the pattern and find the next number.
   a. 8, 12, 16, 20, 24...
   b. 4, 2, 0, -2, -4 ...
   c. 1, 4, 1, 8, 1, 16...
   d. \( \frac{1}{2}, \frac{1}{6}, \frac{1}{10}, \frac{1}{14}, \frac{1}{18} \) ...
   e. 2, 5, 9, 14, 20, 27...
   f. 2, 6, 5, 15, 14, 42, 41, 123 ...
   g. 125, -25, 5, -1 ....
   h. 3, 9, 27, 81...
   i. 3, 6, 11, 18, 27, 38...
   j. 2, 5, 7, 12, 19, 31...
   k. \( \frac{1}{3}, \frac{1}{9}, \frac{1}{27} \) ...
   l. 1=1, 1+4 =5, 1+4+9 =14 ...
   m. 1, 2, 8, 22, 47 ... (hint: use successive differences)
   n. 2, 6, 22, 56, 114... (hint: use successive differences)
   o. 5, 15, 37, 77, 141...(hint: use successive differences)
3. Evaluate.

   a. \(1 + 2 + 3 + \ldots + 10\)
   
   b. \(1 + 2 + 3 + 4 + \ldots + 100\)
   
   c. \(1 + 3 + 5 + 7 + 9 + 11\)
   
   d. \(1 + 3 + 5 + \ldots + 57\)
   
   e. The seventh triangular number
   
   f. The twelfth square number
   
   g. The sixth pentagonal number
   
   h. \(3 + 6 + 9 + 12 + \ldots + 300\)
   
   i. \(2+4+6+8+\ldots+400\)
   
   j. \(51+52+53+\ldots+100\)

4. Solve the following Problems:

   a) What are the final two digits of \(7^{2009}\)?
   
   b) What is the units digit of \(3^{2011}\)?
   
   c) I am thinking of a positive number, if I square it, double the result, take half of that result and then add 12, I get 37. What is my number?
   
   d) If you pay $50 of cash up front and a balance of $35 each week, how long will it take to pay for a computer that costs $960?
   
   e) The cost of renting a car from company A is $9 per 15 minutes. The cost of renting a car from company B is $20 per half an hour. If you plan to rent a car for three hours, which business offers the better deal and by how much?
Answers:

1. a) Inductive  b) Deductive  c) Deductive  d) Inductive

2. 
   a. 28 
   b. -6 
   c. 1 
   d. 1/22 
   e. 35 
   f. 122 
   g. 1/5 
   h. 243 
   i. 51 
   j. 50 
   k. 1/81 
   l. 1+4+9+16=30 
   m. 86 
   n. 202 
   o. 235

3. 
   a. 55 
   b. 5050 
   c. 36 
   d. 841 
   e. 28 
   f. 144 
   g. 51 
   h. \(3(1+2+3+\ldots+100) = 3 \times \frac{101 \times 100}{2} = 15150\) 
   i. \(2(1+2+3+\ldots+200) = 2 \times \frac{201 \times 200}{2} = 40200\) 
   j. \((1+2+3+\ldots+100)-(1+2+\ldots+50) = \frac{101 \times 100}{2} - \frac{51 \times 50}{2} = 3775\)

4. 
   a. 07 
   b. 7 
   c. 5 
   d. 26 weeks 
   e. Company A/ $12