Geometric Series

1. Find T_n for each of these geometric sequences:

    i. 3, 6, 12, 24.....

    ii. 72, 36, 18, 9.....

    iii. 18, -6, 2,$-\frac{2}{3}$.....

2. How many terms are in the sequence 64, 32, 16, 8... , $\frac{1}{16}$?

3. Calculate the general term for each of the following geometric series if:

    i. $T_1 = 3$ and $T_4 = 192$

    ii. $T_2 = \frac{9}{2}$ and $T_5 = \frac{1}{6}$

4. Three consecutive terms of a geometric sequence are $x - 7, x - 3$ and $2x$. Calculate the possible values of x.

5. Find S_n of the following geometric series:

    i. 2+6+18.....

    ii. $24 + 6 + \frac{3}{2}$.....

    iii. 1-2+4-8.........

6. Three numbers form a geometric sequence. If their sum is 26 and their product is 216, find the first term and the common ratio.

7. The first three terms of an arithmetic sequence are 12, p and q. The first three terms of a geometric sequence are 16, p and q. Find the value of p and the value of q.

8. The sum of the first five terms of a geometric series is 3124. The fifth term is 25 times the third term. Find the general term (T_n) for the series.

9. The sum of the first three terms of a geometric series is 21. The sum of the first six terms of the same series is 189. Find the first term and the common ratio of the series.

10. A patient takes a drug to relieve epileptic fits. A single dose of the drug contains 50 mg. The concentration of the drug in the bloodstream fades over time. Every hour, the body processes and removes 20% of the drug from the bloodstream.

    i. Find a general term to describe the amount of drug in the bloodstream t hours after taking the initial single dose.

    ii. What concentration of the drug will be remaining in the bloodstream after 3 hours?

    iii. The patient has a very low chance of having an epileptic fit, as long as the concentration of the drug in the bloodstream remains above a critical level of 12 mg. After how many hours should the patient take the second dose?

    iv. Against doctors orders, the patient decides to take a dose of the drug every hour. How much of the drug will be in his bloodstream after 4 hours (directly after taking the fifth dose)?

    v. A patient will overdose if the concentration of the drug in the blood exceeds 200 mg. If the patient continues to take the drug every hour, how long after the initial dose will he overdose.

11. OPEC control the production of oil in the Middle East, and they have a large amount of control over the price of a barrel of oil. On May 1st the price of a barrel of oil is $40. OPEC decide to limit production, so the price of a barrel of oil will rise. They predict that the price of oil will rise 2% a day for the month of May.

    i. Find a general term that describes the price of a barrel of oil t days after May 1st.

    ii. What will the price of a barrel of oil be on May 31st?

    iii. An investor realises that OPEC has cut production, so the price of oil will rise. He decides to buy one barrel of oil every day, starting on May 1st, until May 31st (he doesn't buy any oil on May 31st.) What will his total investment in oil be worth on the 31st May?

    iv. How much profit would he make if he sold his entire investment in oil on May 31st?