Review

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1. Expand

$$\left(x-\frac{1}{x}\right)^6$$

2. The altitude of a plane is 200 km at 12 noon when the pilot begins her descent. If the plane's altitude is 196 km one minute later, 192 km one minute after that and so on. Determine when the plane will reach an altitude of 68 km.

3. The sum of the first n terms in a geometric series is 2046. How many terms are in this series if the first term is –6 and the common ratio is –2 ?

4. For each of the following find:

i) t_n explicit
ii) t_n recursive
iii) S_n formula
iv) # of terms
v) total sum of given terms

a) $3+6+9+12+\ldots+99$

b) $10 + 20 + 40 + 80 + \ldots + 163840$

c) Find explicit only

i) $5, 55, 555, \ldots$
ii) $-9,\ 101,\ -999,\ 10001,\ -99999, \ldots$

5. Find the first four terms in the expansion of $\left(2+\frac{x}{3}\right)^{12}$

6. Find 1st five terms + decide if arithmetic, geometric, neither

a) $a_n = \frac{2+a_{n-1}}{2}$

$a_1 = 10$

(b) $a_n = a_{n-1} + 4$
$a_1 = 36$

(c) $t_1 = -1$

$$t_n = \begin{cases} -2t_{n-1} \text{ if } t_{n-1} < 0 \\ (t_{n-1} - 3) \text{ if } t_{n-1} > 0 \end{cases}$$

7. The sum of the first five terms in an arithmetic sequence is -40. If $t_9 = 16$ then determine the common difference.

8. How long will it take an investment of $5,000 to triple if the investment earns interest at the rate of 8 % a year compounded quarterly?

9. How many days will it take for a sum of $1,500 to earn $25 interest if it is deposited in a bank paying 5% a year?

10. Muaz will need $130 000 in 4 years to buy a piece of property.
He plans to save money by making equal quarterly deposits into an account earning 6.1% per year compounded quarterly.
What is Muaz's quarterly deposit?

11. A car costs $22,000. After a down payment of $4,000, the balance will be paid off in 48 equal monthly payments with the interest of 18% per year on the unpaid balance. Find the amount of each payment.

12. A company has ordered 20 new PCs at a cost of $1800 each. They will not be delivered for 5 months. What amount should the firm deposit in an account paying 8.1% to have enough money to pay for them?

13. How long (in years) for $1000 to reach $2000 at 5% p.a. compounded semi-annually?

14. Determine the total amount of interest earned on an annuity consisting of quarterly deposits of $1500.00 for ten years, if the annuity earns 9% interest per annum, compounded quarterly.

15. A lottery offers a prize of $750 every week for 5 years.
The first payment will be made one week from now.
If money can be invested at 4.4% per year compounded weekly, what cash payment received immediately is equivalent to the lottery prize?