Geometric Progressions

1. Write down the next three terms of the sequence: 2,6,18, ...
2. Find the first three terms of the sequence in which $T_n = 3^n$
3. Determine whether or nor the following numbers form a geometric sequence:
   (i) 8, 16, 32,
   (ii) -3, 0, 3,
   (iii) -2, 6, -18,
   (iv) $1^2, 2^2, 3^2$,
   (v) $5^3, 5^4, 5^5$
4. Find the 7^{th} member of the sequence: 7, 21, 63, ...
5. Find the 9^{th} member of the sequence: -5, 30, -180, ...
6. Is 242 a member of the sequence: 2, 8, 32, ...? If so, which term is it?
7. Is 584 a member of the sequence: 4, 12, 36, ...? If so, which term is it?
8. Find the sum of the first 10 terms of the geometric sequence in which the first term is 8 and the common ratio is 3.
9. Find the sum of the first 12 terms of the sequence: 3, 12, 48, ...
10. Find $\sum_{n=2}^{8} 2^n$
11. The 6^{th} term of a G.P. is 972 and the 12^{th} term is 708 588. Find the first term and the common ratio.
12. Find the sum of $4^1 + 4^2 + 4^3 + ... + 4^{20}$. Give your answer in scientific notation to 3 significant figures.
13. Amanda was starting a bird sanctuary. She bought 14 swans in January, 2000. These had increased to 28 in July 2000 and 56 in January 2001. If the swan population continued to increase at the same rate, how many swans would Amanda have in January 2006?
14. Samantha's parents opened a bank account for her when she was born and deposited $1 in it. They deposited $2 on her first birthday, $4 on her second birthday and so on, with the deposits doubling each birthday. The parents discontinued making deposits after they made a deposit exceeding a million dollars.
    On what birthday did the deposit exceed a million dollars?
15. A poker machine was programmed to return 80% to the player i.e. for every $100 inserted into the machine, $80 is returned to the player in prizes. Willie Gobroke put $50 into the poker machine and continued to play, inserting all prize money back into the poker machine until he had run out of money. If he maintained a consistent 80% return and each spin of the poker machine cost $1, how many spins would Willie get until he had run out of money?
16. Use the limiting sum formula to evaluate the following recurring decimals:

    (i) $0.\dot{4}$ (ii) $0.\dot{6}\dot{8}$ (iii) $0.6\dot{8}$ (iv) $0.\dot{2}0\dot{6}$

Answers:

1. 54, 162, 486,
2. 3, 9, 27
3. (i) yes (ii) no (iii) yes (iv) no (v) yes
4. 15309
5. -8 398 080
6. No
7. No.
8. 236 192
9. 16 777 215
10. 508
11. $a = 4, r = 3$
12. 1.47×10^{12}
13. 114 688
14. 19^{th}
15. 250
16. (i) $\frac{4}{9}$ (ii) $\frac{68}{99}$ (iii) $\frac{31}{45}$ (iv) $\frac{206}{999}$