

PROBLEM SET 11-5
(Geometric Series)

Use the following information about a geometric series to complete.

1. $a_1 = 1, a_2 = 2, S_5 = \underline{\hspace{2cm}}$
2. $a_1 = 2, a_2 = 6, S_6 = \underline{\hspace{2cm}}$
3. $a_1 = 1, a_2 = -3, S_6 = \underline{\hspace{2cm}}$
4. $a_1 = 3, a_2 = -6, S_5 = \underline{\hspace{2cm}}$
5. $a_1 = 5, r = 3, S_{10} = \underline{\hspace{2cm}}$
6. $a_1 = 7, r = 2, S_{10} = \underline{\hspace{2cm}}$
7. $a_1 = 6, r = -2, S_9 = \underline{\hspace{2cm}}$
8. $a_1 = 5, r = -3, S_9 = \underline{\hspace{2cm}}$
9. $\sum_{n=1}^6 2(3)^{n-1} = \underline{\hspace{2cm}}$ (rounded to nearest tenth)
10. $\sum_{n=1}^7 3(2)^{n-1} = \underline{\hspace{2cm}}$ (rounded to nearest tenth)
11. $S_n = -364, r = -3, n = 6, a_1 = \underline{\hspace{2cm}}$
12. $S_n = 315, a_n = 5, r = \frac{1}{2}, a_1 = \underline{\hspace{2cm}}$

Miquel is at the amphitheater and receives a text message at 12:00. Five minutes later he forwards the text message to three people. Five minutes later, those three people forward the text message to three new people. Assume this pattern continues and each time the text message is sent to people who have not received it before. The number of people who receive the text forms a geometric sequence (1, 3, ...).

13. Calculate the total number of people who will have received the text by 12:30.
14. Calculate the exact time at which 29,524 people will have received the text.



Determine whether or not the indicated geometric series converges. If it does, find the value to which it converges.

15. $a_1 = 3$ and $r = \frac{1}{5}$

16. $a_1 = 5$ and $r = \frac{1}{3}$

17. $a_1 = 42$ and $r = -\frac{3}{4}$

18. $a_1 = 42$ and $r = -\frac{4}{3}$

19. $a_1 = 18$ and $r = \frac{7}{5}$

20. $a_1 = 100$ and $r = 0.1$

21. $a_1 = 81$ and $a_5 = 1$

22. $\sum_{n=1}^{\infty} 3\left(\frac{1}{4}\right)^{n-1}$

23. $\sum_{n=1}^{\infty} \left(-\frac{1}{3}\right)^{n-1}$

24. $\sum_{n=1}^{\infty} 7(2)^{n-1}$