Name:_____ Date:_____

HW M12P Section 8.3 Infinite Geometric Series

1. What happens to the sum of an infinite geometric series if the common ratio is bigger than 1? Explain

2. What happens to the sum of an infinite geometric series if the common ratio is between 1 and -1? Explain

3. What happens to the sum of an infinite geometric series if the common ratio is less than -1? Explain

4. How can you tell if a geometric series is finite OR infinite?

5. In the infinite geometric series formula, why r^n equal to zero?

6. What are the conditions required to use the infinite geometric series formula: $S = \frac{a}{1-r}$? Please state all conditions required:

7. Find the sum for the following infinite geometric series. Show all your work and steps:

a) $S = 8+4+2+.....$	b) $S = \frac{14}{3}+\frac{7}{3}+\frac{7}{6}+.....$
c) $S = 8\sqrt{2}-8+4\sqrt{2}+.....$	d) $S = 1-0.5+0.25-\frac{1}{8}+.....$
e) $S = \frac{64}{81}+\frac{32}{27}+\frac{16}{9}+.....$	f) $S = \frac{125}{64}-\frac{25}{16}+\frac{5}{4}-.....$
$S = 27+9+3+1+.....$	$S = 2+1.8+1.62+1.458+.....$

$S = 0.4 + \frac{3}{100} + \frac{3}{1000} + \frac{3}{10000} + ...$	$S = 11 + 16 + 8 + 4 + 2 + ...$

8. Given the information of a geometric sequence, find the indicated unknown value:

a) $r = 2,\ S_\infty = 4500,\ a = ?$	b) $a = 12,\ S_\infty = 350,\ r = ?$
c) $1 + x + x^2 + x^3 + ... = 20\ ;\ x = ?$	d) $S_3 = 19,\ S_\infty = 27,\ r =$

e) $a = x+2,\ t_2 = 3x,\ t_3 = x^2+8,\ S_\infty =$	f) $t_2 = 3x,\ t_3 = 2x-1,\ t_4 = 7x+8,\ S_\infty =$

9. What is the sum of the following geometric series?

$$12+\frac{3}{4}+\frac{9}{16}+\frac{27}{64}+...$$

10. What is the sum of the following series: $\frac{2}{3}-\frac{8}{27}+\frac{32}{243}-\frac{128}{2187}+.....$

11. The sum of an infinite geometric series is 1 and the common ratio is $-\frac{2}{5}$, determine the first three terms.

12. Determine the 8th term of an infinite geometric series with $S_{\infty} = 24$ and $r = \frac{3}{4}$

13. A ball is dropped from a height of 2.0m to a floor. After each bounce, the ball rises to 63% of its previous height. What is the total vertical distance the ball has travelled after 5 bounces? What is the total vertical distance the ball travelled after it comes to rest?

14. An oil well produces 30,000 barrels of oil during its first month of production. Suppose its production drops by 5% each month.
    b) Estimate the total production before the well runs dry.

    c) At which month will the number barrels in a day be less than 100 barrels?

15. A contest winner is given two prizes to choose from. Prize A is given $25,000,000 right away. Prize "B" is given $10,000,000 in the first year, $3,333,333 in the next year, $1,111,111 the next year….. with each year equal to 1/3 of the previous year for the rest of their life. Which prize will get more money in their lifetime?

16. For what values of "x" will the series have a finite sum? $1+\left(\frac{x-2}{3}\right)+\left(\frac{x-2}{3}\right)^2+\left(\frac{x-2}{3}\right)^3+....$

17. The geometric series $a+ar+ar^2+....$ has a sum of 7, and the terms involving odd powers of "r" have a sum of 3. What is $a+r$?