$\frac{a_1}{1-r}$

Pre-Calculus **HW#10.3-4** **Name:** Key

Decide what type of sequence each is (arithmetic, geometric, neither).

1. $\frac{1}{2},\frac{3}{2},\frac{9}{2},\frac{27}{2},\frac{81}{2},\ldots$ G

2. 3,6,12,24,48,... G

3. –5,5,–7,7,–5,5,–7,7,... N

4. 2,5,8,11,14,... A

For each geometric sequence, find the missing information.

5. $100,5,\frac{1}{4},\frac{1}{80},\frac{1}{1600},\ldots$

$a_n = \underline{100\left(\frac{1}{20}\right)^{n-1}}$

6. $a_3 = 180, a_6 = 38{,}880$

$a_n = \underline{5 \cdot 6^{n-1}}$

$180r^3 = 38880$
$r^3 = 216$
$r = 6$
$180 = a_1 \cdot 6^2$
$5 = a_1$

Evaluate each sum.

7. $\sum_{i=1}^{25} 4i+1$ $(5+101)\frac{25}{2} = 1325$

8. $\sum_{n=1}^{\infty} 5\left(\frac{4}{9}\right)^{n-1}$ $\frac{5}{1-\frac{4}{9}} = 5 \cdot \frac{9}{5} = 9$

9. $\sum_{n=1}^{15} 4\left(\frac{1}{2}\right)^{n-1}$ $4\left(\frac{1-\frac{1}{2}^{15}}{1-\frac{1}{2}}\right)$

$= 7.99 \approx 8$

10. $\sum_{n=0}^{11} 6\left(\frac{1}{2}\right)^{n}$ $6\left(\frac{1-\frac{1}{2}^{12}}{1-\frac{1}{2}}\right) = 11.997$

≈ 12

11. $\sum_{i=1}^{50} 2i+5$ $(7+105)25$

2800

12. $\sum_{n=0}^{\infty} 12\left(\frac{1}{4}\right)^{n}$ $\frac{12}{1-\frac{1}{4}} = 12 \cdot \frac{4}{3} = 16$

13. $\sum_{n=1}^{\infty} \frac{1}{8}(8)^{n-1}$ no sum

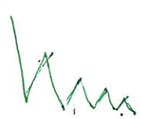
14. A square has sides of 10 inches each. A second square is inscribed in the original square by joining the midpoints of the sides. A third square is then inscribed inside the second square by joining the midpoints of the sides of the second square. This process continues endlessly. What is the sum of the areas of the infinite sequence of squares?

$A_1 = 100$
$A_2 = 50$
$A_3 = 25$

$a_1 = 100$
$r = \frac{1}{2}$

$\frac{100}{1-\frac{1}{2}} = 200\ in^2$

15. You drop a superball from a height of 5 feet. After each time it hits the ground, it bounces to $\frac{8}{9}$ of its previous height. What is the total distance that the ball travels before it comes to rest?



$\frac{5}{1-\frac{8}{9}} = 5 \cdot 4 = 45$ down distances

$+40$ up distances

85 ft

$45 \cdot 2 - 5$
$90 - 5$
85