

Find the sum of the infinite geometric series, if it exists.

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

$$|r| < 1$$

$$\sum_{i=1}^{\infty} 2 \left(\frac{3}{4}\right)^i$$

$$r = \frac{3}{4} \quad a_1 = \frac{3}{2}$$

$$S = \frac{a_1}{1-r} = \frac{\frac{3}{2}}{1-\frac{3}{4}} = 6$$

Express the series using summation notation.  
Find the sum or explain why it doesn't exist.

$$7.) 4 + 6 + 9 + \frac{27}{2} + \frac{81}{4} \quad \text{geometric}$$

$$r = \frac{3}{2}$$

$$\sum_{i=1}^5 4 \left(\frac{3}{2}\right)^{i-1}$$

$$S_n = a_1 \left( \frac{1-r^n}{1-r} \right)$$

$$S_5 = 4 \left( \frac{1 - \left(\frac{3}{2}\right)^5}{1 - \frac{3}{2}} \right)$$

Solve for n.

$$\sum_{i=1}^n (2-3i) = -70$$

$a_n$

$$-70 = \frac{n}{2}(-1+2-3n)$$

$$-140 = n(1-3n)$$

$$-140 = n - 3n^2$$

Arithmetic

$$S_n = \frac{n}{2}(a_1 + a_n)$$

$\uparrow$   
rule

$$3n^2 - n - 140 = 0$$

$$(3n+20)(n-7) = 0$$

$$n = \frac{-20}{3}$$

$n = 7$

$$\begin{array}{r} 3 \ 1 \\ 20 \ 7 \end{array}$$

$$15.) \sum_{i=1}^n 3(2)^i = \underline{3066}$$