

Find the  $n$ th term of the arithmetic sequence.

$$a_n = a_1 + d(n-1)$$

$$17, 11, 5, -1, \dots a_{39}$$

$$a_n = 17 - 6(n-1)$$

$$a_{39} = 17 - 6(39-1)$$

$$= -211$$

$$-40, -47, -54, -61, \dots a_{29}$$

$$a_n = -40 - 7(n-1)$$

$$a_{29} = -40 - 7(29-1)$$

$$= -236$$

$$a_1 = 12, d = 3 \quad n = 15$$

$$a_{10} = 13 \text{ and } a_{24} = 20 \quad n = 8$$

$$a_n = 12 + 3(n-1)$$

$$= 12 + 3(15-1)$$

$$= 54$$

$$d = \frac{20-13}{24-10} = \frac{7}{14} = \frac{1}{2}$$

$$a_{10} = a_1 + \frac{1}{2}(10-1)$$

$$13 = a_1 + \frac{1}{2}(9)$$

$$\begin{array}{rcl} 13 & = & a_1 + 4.5 \\ & - 4.5 & - 4.5 \end{array}$$

$$8.5 = a_1$$

$$a_n = 8.5 + \frac{1}{2}(n-1)$$

Find the sum.

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

$$13+15+17+19+21+\boxed{23}$$

$$S_6 = \frac{6}{2}(13+23)$$

$$3(36)$$

$$108$$

$$7+9+11+13\dots n=10$$

$$S_{10} = \frac{10}{2}(7+a_{10})$$

$$= \frac{10}{2}(7+25)$$

$$5(32)$$

$$160$$

$$a_1 = 42, a_n = 146, n = \textcircled{14}$$

$$S_{14} = \frac{14}{2}(42+146) \\ = 7(188)$$

$$= 1316$$

$$a_n = 7+2(n-1)$$

$$a_{10} = 7+2(9) \\ = 25$$

$$\sum_{k=1}^{35} (5k - 2) \quad a_1 = 5(1) - 2 = 3 \\ a_{35} = 5(35) - 2$$

$$S_{35} = \frac{35}{2} (a_1 + a_{35})$$

$$= \frac{35}{2} (3 + 173)$$

$$= 3080$$

$$\sum_{k=1}^{45} (3k - 9)$$

$$S_{45} = \frac{45}{2} (a_1 + a_{45})$$

$$= \frac{45}{2} (-6 + 126)$$

$$2700$$

Find the nth term of the geometric sequence.

$$a_1 = 4, r = \frac{3}{5}, n = 8$$

$$a_n = a_1 r^{n-1}$$

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

$$a_8 = 4 \left(\frac{3}{5}\right)^{8-1}$$

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

$$a_4 = -\frac{40}{27}, a_7 = \frac{320}{729},$$

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

$$\frac{\frac{320}{729}}{-\frac{40}{27}} = \sqrt[3]{-\frac{8}{27}} = \sqrt[3]{-3}$$

$$7, 21, 63, \dots$$

$$n = 15$$

$$a_n = 7(3)^{n-1}$$

$$= 37,480,783$$

$$a_4 = a_1 r^3$$

$$\left(-\frac{27}{8}\right) \left(-\frac{40}{27}\right) = a_1 \left(-\frac{8}{27}\right)$$

$$5 = a_1$$

Find the sum.

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

$$\sum_{n=1}^9 2^{n-1} = 1(2)^{n-1}$$
$$S_1 = \frac{1(1-2^9)}{1-2}$$
$$= 511$$

$$\sum_{n=0}^{20} 3\left(\frac{3}{2}\right)^n$$
$$S_{21} = \frac{3\left(1-\left(\frac{3}{2}\right)^{21}\right)}{1-\frac{3}{2}}$$
$$= 29921.31057$$

$$\sum_{i=1}^7 64\left(-\frac{1}{2}\right)^{i-1} = \frac{64\left(1-\left(-\frac{1}{2}\right)^7\right)}{1-\left(-\frac{1}{2}\right)}$$
$$= 43$$

$$\sum_{i=0}^5 32\left(\frac{1}{4}\right)^i = \frac{32\left(1-\frac{1}{4}^5\right)}{1-\frac{1}{4}}$$
$$= \frac{1365}{32}$$

Find the sum.

$$S_{\infty} = \frac{a_1}{1-r}$$

$$\sum_{n=0}^{\infty} \left(\frac{1}{2}\right)^n \quad S_{\infty} = \frac{1}{1 - \frac{1}{2}} \\ = \frac{1}{\frac{1}{2}} = 2$$

$$\sum_{n=0}^{\infty} 2 \left(\frac{2}{3}\right)^n \quad S_{\infty} = \frac{2}{1 - \left(\frac{2}{3}\right)} \\ = \frac{2}{\frac{1}{3}} = 6$$

$$\sum_{n=0}^{\infty} 4 \left(-\frac{1}{2}\right)^n$$

$$\sum_{n=0}^{\infty} 10 \left(\frac{5}{4}\right)^n \quad r > 1$$

$$S = \frac{4}{1 - \left(-\frac{1}{2}\right)} \\ \frac{4}{\frac{3}{2}} = \frac{8}{3}$$

Diverges

Use summation notation to find the sum.

$$5+15+45+\dots+3645$$

$$2 - \frac{1}{2} + \frac{1}{8} - \dots + \frac{1}{2048}$$

$$8 + 6 + \frac{9}{2} + \frac{27}{8} \dots$$