

**I. Find the sum of the first n terms for each series. Must show work!**

<p>1.) first 3 terms for <math>a_n = 2n - 6</math></p> $a_1 = 2(1) - 6 = -4$ $a_2 = 2(2) - 6 = -2$ $a_3 = 2(3) - 6 = 0$ $S_3 = -4 + -2 + 0 = -6$ <p><math>S_3 = -6</math></p>	<p>2.) first 5 terms for <math>a_n = 4 - 5n</math></p> $a_1 = 4 - 5(1) = -1$ $a_2 = 4 - 5(2) = -6$ $a_3 = 4 - 5(3) = -11$ $a_4 = 4 - 5(4) = -16$ $a_5 = 4 - 5(5) = -21$ $S_5 = -55$	<p>3.) first 4 terms for <math>a_n = \frac{1}{2}n + 3</math></p> $a_1 = \frac{1}{2}(1) + 3 = 3.5$ $a_2 = \frac{1}{2}(2) + 3 = 4$ $a_3 = \frac{1}{2}(3) + 3 = 4.5$ $a_4 = \frac{1}{2}(4) + 3 = 5$ $S_4 = 17$
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**II. Find sum for each arithmetic series described. Must show work!**

<p>4.) <math>a_1 = 16, a_n = 98, n = 13</math></p> $S_{13} = \frac{13}{2}(16 + 98)$ <p><math>S_{13} = 741</math></p>	<p>5.) <math>a_1 = 5, n = 11, d = 4</math></p> $a_{11} = 5 + 4(11 - 1) = 45$ $S_{11} = \frac{11}{2}(5 + 45)$ <p><math>S_{11} = 275</math></p>	<p>6.) <math>d = -8, n = 16, a_n = -108</math></p> $-108 = a_1 - 8(16 - 1)$ $a_1 = 12$ $S_{16} = \frac{16}{2}(12 - 108)$ <p><math>S_{16} = -768</math></p>
<p>7.) <math>8 + 15 + 22 + \dots + 155</math></p> $155 = 8 + 7(n - 1)$ $147 = 7n - 7 \rightarrow n = 22$ $S_{22} = \frac{22}{2}(8 + 155)$ <p><math>S_{22} = 1793</math></p>	<p>8.) first 17 positive odd integers</p> $1 + 3 + 5 + \dots + a_{17}$ $a_{17} = 1 + 2(17 - 1) \rightarrow 33$ $S_{17} = \frac{17}{2}(1 + 33)$ <p><math>S_{17} = 289</math></p>	<p>9.) <math>a_1 = 14, n = 21, d = -6</math></p> $a_{21} = 14 - 6(21 - 1) = -106$ $S_{21} = \frac{21}{2}(14 - 106)$ <p><math>S_{21} = -966</math></p>
<p>10.) <math>d = \frac{2}{5}, n = 10, a_n = \frac{19}{5}</math></p> $\frac{19}{5} = a_1 + \frac{2}{5}(10 - 1)$ $\frac{19}{5} = a_1 + \frac{18}{5} \rightarrow a_1 = \frac{1}{5}$ $S_{10} = \frac{10}{2}\left(\frac{1}{5} + \frac{19}{5}\right)$ <p><math>S_{10} = 20</math></p>	<p>11.) <math>a_n = 148, a_1 = -20, n = 25</math></p> $S_{25} = \frac{25}{2}(-20 + 148)$ <p><math>S_{25} = 1600</math></p>	<p>12.) multiples of 3 between 3 and 78 inclusive</p> $3 + 6 + 9 + \dots + 78$ $78 = 3 + 3(n - 1)$ $75 = 3n - 3 \rightarrow n = 26$ $S_{26} = \frac{26}{2}(3 + 78)$ <p><math>S_{26} = 1053</math></p>

**III. Use the arithmetic series formula to complete each problem. Must show work!**

<p>13.) What is the first term if the sum of the first 12 terms is 1,260 and the last term is 204?</p> $1260 = \frac{12}{2}(a_1 + 204)$ $1260 = 6(a_1 + 204)$ $210 = a_1 + 204$ <p><math>a_1 = 6</math></p>	<p>14.) How many terms were added together if first term is 5, the last term is 113, and the sum is 1,121?</p> $1121 = \frac{n}{2}(5 + 113)$ $2242 = \frac{118n}{118}$ <p><math>n = 19 \rightarrow 19 \text{ terms}</math></p>	<p>15.) What is the last term if the sum of first 25 terms is -525 and the first term is 15?</p> $-525 = \frac{25}{2}(15 + a_n)$ $-525 = 12.5(15 + a_n)$ $-42 = 15 + a_n$ <p><math>a_n = -57</math></p>	<p>16.) What is the second term of the series if the sum of first 16 terms is -120 and the 16th term is 15?</p> $-120 = \frac{16}{2}(a_1 + 15)$ $-15 = a_1 + 15$ $a_1 = -30$ $a_2 = -27$
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**III. Find the sum using the appropriate method.**

<p>17.) <math>\sum_{n=1}^3 6n + 2</math></p> $a_1 = 6(1) + 2 = 8$ $a_2 = 6(2) + 2 = 14$ $a_3 = 6(3) + 2 = 20$ <p><math>S_3 = 42</math></p>	<p>18.) <math>\sum_{n=4}^8 4 - 7n</math></p> $a_1 = 4 - 7(4) = -24$ $a_2 = 4 - 7(5) = -31$ $a_3 = 4 - 7(6) = -38$ $a_4 = 4 - 7(7) = -45$ $a_5 = 4 - 7(8) = -52$ <p><math>S_5 = -190</math></p>	<p>19.) <math>\sum_{n=1}^{20} 4n - 3</math></p> $a_1 = 4(1) - 3 = 1$ $a_{20} = 4(20) - 3 = 77$ $n = 20 - 1 + 1 = 20$ $S_{20} = \frac{20}{2}(1 + 77)$ <p><math>S_{20} = 780</math></p>	<p>20.) <math>\sum_{n=6}^{32} 3(2n + 3)</math></p> $a_1 = 3(2 \cdot 6 + 3) = 45$ $a_{32} = 3(2 \cdot 32 + 3) = 201$ $n = 32 - 6 + 1 = 27$ $S_{27} = \frac{27}{2}(45 + 201)$ <p><math>S_{27} = 3326</math></p>
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