A# _____

Convergent Series Worksheet

Tell whether the geometric series converges. If it does converge, determine the value to which it converges.

1) $a_1 = 5,\ r = \frac{1}{2}$

2) $a_1 = 29,\ r = -\frac{2}{3}$

3) $a_1 = 59,\ r = 1.2$

4) $a_1 = -96,\ r = -0.02$

5) $a_1 = 100,\ r = -\frac{3}{5}$

6) $a_1 = 81,\ r = \frac{7}{4}$

7) $a_1 = 93,\ r = -\frac{3}{4}$

8) $a_1 = 78,\ r = \frac{2}{5}$

Write as the ratio of two integers.

9) 0.29292929…

10) 0.36363636…

11) 0.219191919…

12) 1.57575757…

13) If $r = \frac{x}{5}$, for what values of *x* will the geometric series converge?

14) If $r = x - 3$, for what values of *x* will the geometric series converge?

15) If $r = \frac{2}{x}$, for what values of *x* will the geometric series converge?

For each geometric series, determine the interval of convergence and the sum (expressed in terms of *x*).

16) $1 + 3x + 9x^2 + \ldots$

17) $1 + (x-1) + (x-1)^2 + (x-1)^3 + \ldots$

18) $1 - \frac{1}{x} + \frac{1}{x^2} - \frac{1}{x^3} + \ldots$

For the following series, determine the first four partial sums, suggest a formula for S_n determine the value of S.

19) $\frac{1}{1 \cdot 3} + \frac{1}{3 \cdot 5} + \frac{1}{5 \cdot 7} + \ldots + \frac{1}{(2n-1)(2n+1)}$

20) $\frac{1}{1 \cdot 4} + \frac{1}{4 \cdot 7} + \frac{1}{7 \cdot 10} + \ldots + \frac{1}{(3n-2)(3n+1)}$