Sum of infinity convergent geometric sequences

Student name: _____ Score: _____

1. The sum of an infinite geometric sequence is 24.25, The second term of the sequence, u_2, is 3.88. Find the possible values of r.

2. The first term of an infinite geometric sequence is 6.
   The sum of the infinite sequence is 120.

   (a) Find the common ratio.

   (b) Find the sum of the first 10 terms.

   (c) Find the least value of n for which $S_n > 90$.

3. Consider the infinite geometric sequence 16, 4, 1, 0.25, …

   (a) Find the common ratio.

   (b) Find

       (i)   the 10th term.

       (ii)   an expression for the nth term.

   (c) The sum of the infinite sequence.

4. Consider the infinite geometric sequence with u1 = 36 and r = $\frac{1}{3}$

   (a) Find u_5

   (b) Find the sum of the infinite sequence.

5. The sum of the first three terms of a geometric sequence is 123.48, and the sum of the infinite sequences is 320.

   (a) Find the common ratio.

   (b) Find the first three terms of the geometric sequence.

6. Consider the infinite geometric series $750 + 450 + 270 + …$

   (a) For this series, find the common ratio giving your answer as a fraction in its simplest form.

   (b) Find the fourteenth term of this series.

   (c) Find the **exact** value of the sum of the infinite series.

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7. Consider the infinite geometric sequence 4000, –2400, 1440, –864, …

   (a) Find the common ratio.

   (b) Find the 14th term.

   (c) Find the exact sum of the infinite series.

8. Consider the infinite geometric sequence 27, 9, 3, 1, …

   Find the sum of the infinite sequence.

Sum of infinity convergent geometric sequences

Student name: _____ ANSWERS _____ Score: _____

1. The sum of an infinite geometric sequence is 24.25, The second term of the sequence, u_2, is 3.88. Find the possible values of r. $r = 0.2$ or $r = 0.8$

2. The first term of an infinite geometric sequence is 6.
The sum of the infinite sequence is 120.

   (a) Find the common ratio. $r = 0.95$

   (b) Find the sum of the first 10 terms. 48.15

   (c) Find the least value of n for which $S_n > 90$. $n = 28$

3. Consider the infinite geometric sequence 16, 4, 1, 0.25, …

   (a) Find the common ratio. $r = \dfrac{1}{4}$

   (b) Find

   (i)   the 9th term.   0.000244

   (ii) an expression for the nth term. $u_n = 16 \left(\dfrac{1}{4}\right)^{n-1}$

   (c) The sum of the infinite sequence. 21.3

4. Consider the infinite geometric sequence with $u_1 = 36$ and $r = \dfrac{1}{3}$

   (a) Find u_5 $\dfrac{4}{9}$

   (b) Find the sum of the infinite sequence.   54

5. The sum of the first three terms of a geometric sequence is 123.48, and the sum of the infinite sequences is 320.

   (a) Find the common ratio. $r = 0.85$

   (b) Find the first three terms of the geometric sequence.   48, 40.8, 34.68

6. Consider the infinite geometric series $750 + 450 + 270 + \ldots$

   (a) For this series, find the common ratio giving your answer as a fraction in its simplest form. $\dfrac{3}{5}$

   (b) Find the thirteenth term of this series.   1.63

   (c) Find the **exact** value of the sum of the infinite series.   1875

7. Consider the infinite geometric sequence 4000, –2400, 1440, –864, …

(a) Find the common ratio. $-\dfrac{3}{5}$

(b) Find the 14$^{\text{th}}$ term. –5.22

(c) Find the exact sum of the infinite series. 2500

8. Consider the infinite geometric sequence 27, 9, 3, 1, …

Find the sum of the infinite sequence. 40.5