 Geometric sequences and series

The activities include ideas for questions and sample questions.

Part 1: The nth term of a geometric sequence or series

Samples problems include:

1. For the geometric sequence, state the values of a and r and hence find the 20th term.

$$4, 6, 9, …$$

1. Given $a=5$ and $r=1.1$, write the first 6 terms of the geometric sequence.
2. How many terms does the following geometric sequence contain?

2, 8, 32, …, 524 288

1. Write the geometric series using sigma notation:

$$2+8+32+ …+524 288$$

1. Find the first term in the geometric sequence which is less than 0.01

50, 25, 12.5,…

1. Find the first term in the geometric sequence which is more than 100

4, 4.4, 4.84

1. Given the terms of an geometric sequence, $T\_{3}=36$ and $T\_{5}=81$, find a and r.

Part 2: The sum of a geometric sequence or series

1. Find the sum of the first 10 terms of the sequence 7, 14, 28, …
2. Find the sum of $5+10+20+...+640$
3. Find the sum of the first 20 terms of the sequence 40, -20, 10, -5 …
4. Find the sum of the first 20 terms of the series $50+4+25+6+12.5+8+...$

Part 3: The limiting sum of a geometric sequence or series

Samples problems include:

1. Calculate the limiting sum of $20+10+5+ …$
2. Calculate the limiting sum of $(-27)+9+(-3)+1$
3. Convert $0.\dot{2}$ into a fractions by expressing it as a geometric series and calculating the limiting sum.
4. A ball is dropped vertically from a height of 2m, each time it lands it bounces back to a third of its previous height. What is the total distance travelled by the ball?
5. If the limiting sum equals 5a, find r.
6. The second term of a geometric series is 6 and the limiting sum is 27. Find the possible values of r?