

# Discrete Mathematics

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## Problem Statement

The sum of first three terms of a G.P is  $39/10$  and their product is 1. Find the common ratio and the terms.

## Solution

Given the sequence of an numbers in G.P

Let the three terms which are in G.P be  $a/r, a, ar$

where  $r$  is the common ratio of the sequence and  $a$  is the second term of the G.P

given the product of them is 1 which is  $a/r \cdot a \cdot ar = a^3 = 1$  so  $a = 1$

given their sum is  $39/10$  which is  $a/r + a + ar = 39/10$

$$\frac{1}{r} + 1 + r = \frac{39}{10}$$

$$10r^2 + 10r + 10 = 39r$$

$$10r^2 - 29r + 10 = 0$$

$$10r^2 - 25r - 4r + 10 = 0$$

$$5r(2r - 5) - 2(2r - 5) = 0$$

$$(5r - 2)(2r - 5) = 0$$

$r = 2/5$  or  $5/2$

The terms of the G.P are:

1. If  $r = 2/5$  , then terms are  $5/2, 1, 2/5$ .
2. If  $r = 5/2$  , then terms are  $2/5, 1, 5/2$ .