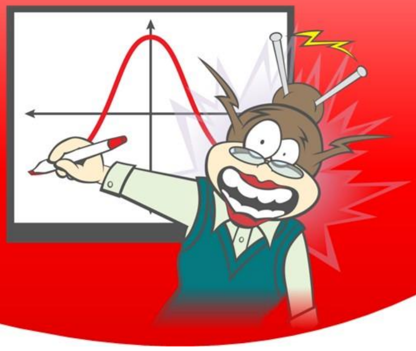
STUDENT REVISION SERIES



Arithmetic and Geometric Sequences

Each of the questions included here can be solved using either the TI-Nspire CX or CX CAS.

Scan the QR code or use the link: https://bit.ly/sequence_and_series

Question 1

Determine the first eight terms of the sequence defined by $t_n = 2n + 7$

Question 2

Determine the first ten terms of the sequence $t_n = t_{n-1} + 7$ given $t_1 = 4$

Question 3

The fourth term in an arithmetic sequence is 27 and the tenth term is 63. What is the first term and the common difference?

Author: Rodney Anderson

Question 4

For the geometric sequence 5 , 15 , 45 , . . . determine how many terms are added together to obtain a sum of 5 465.

Question 5

The 1st term of a geometric sequence is 3 and the 12th term is 6 144. Determine the 9th term.

Question 6

The first three terms of an infinite geometric sequence are $b-1$, 6 , $b+4$ where $b \in Z$

(a) Determine the possible values of b

(b) Determine the possible values of r

(c) Calculate the sum of this infinite sequence

Questions used in this worksheet were sourced from/inspired by:

- https://www.qcaa.qld.edu.au/senior/senior-subjects/mathematics/mathematics-methods/assessment
- Mathematical Methods Units 1 & 2 for Queensland, Cambridge University Press

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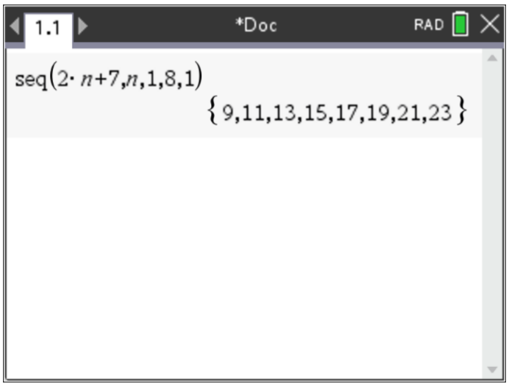
Answers

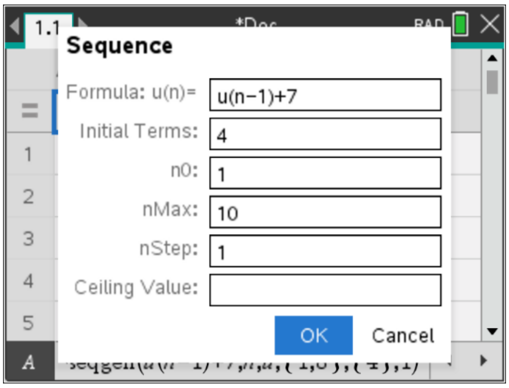
Question 1



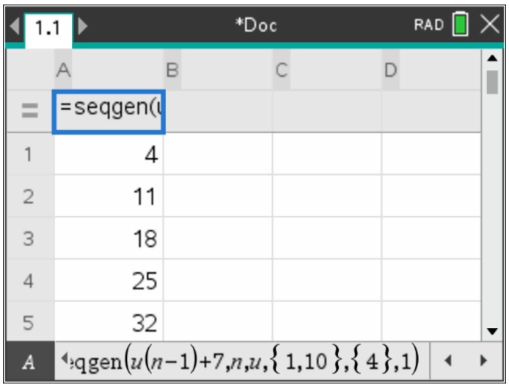
Using a sequence command in a Calculator application.

Seq(Expression, Variable, Low, High, Step)

Question 2

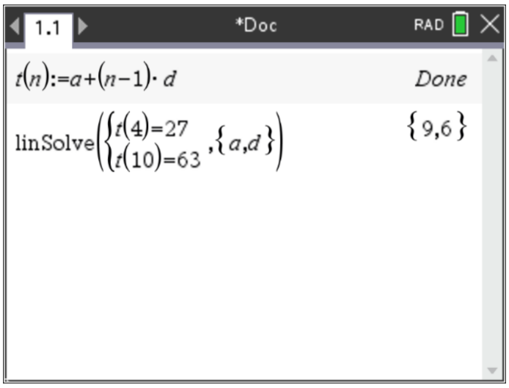


In a Lists and Spreadsheet application, press (menu) and select Data, Generate Sequence



If you click in the formula cell for column A the syntax is shown at the bottom (and this is the syntax for a Calculator application)

Question 3



In a Calculator application, define the arithmetic sequence.

Press (menu) and select Algebra, Solve System of Linear Equations and modify the settings to suit your defined equation.

First term is 9 and the common difference is 6.

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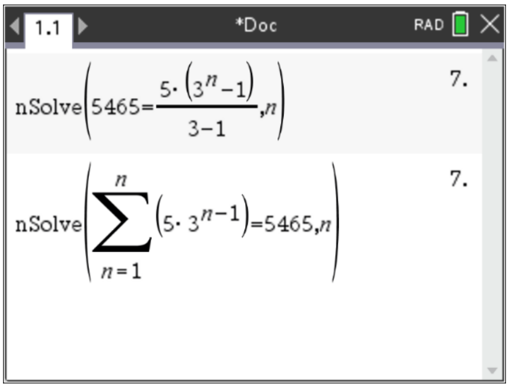
Question 4

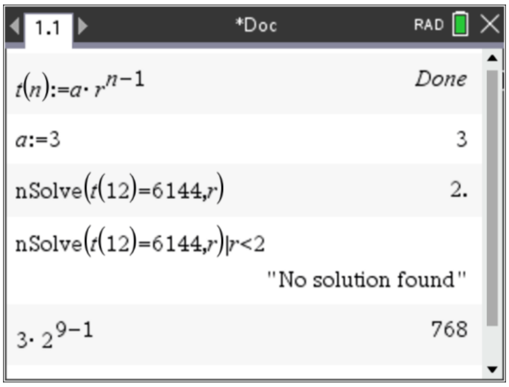


After determining that the ratio is 3, use Numerical Solve in a Calculator application.

Syntax in the brackets is equation, comma, variable.

Numerically solving using the sum command obtains the same answer.

Question 5



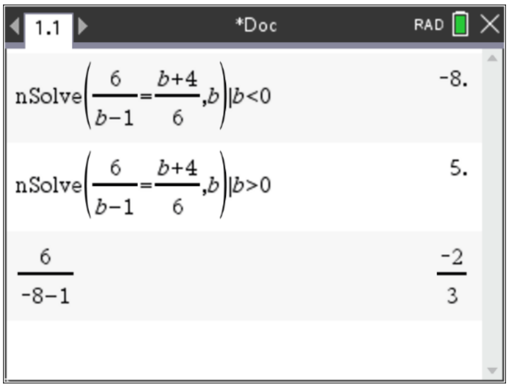
Define the equation for a geometric sequence.

Define the first term to be 3.

Numerically solve to find r.

Check to see if there is a value for $r < 2$ (and you could also check to see if there is a value for $r > 2$).

Question 6

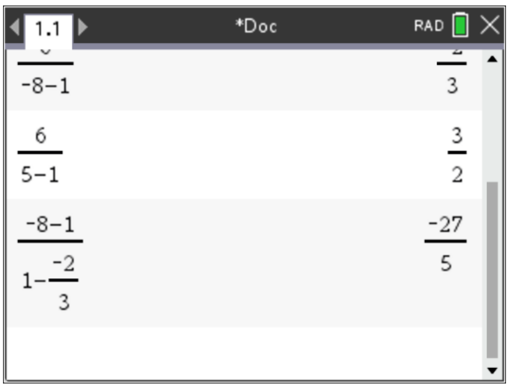


With numerical solve, it only calculates one solution.

Solve for any negative values of b.

Solve for any positive values of b.

Be careful as sometimes the solutions can be both positive or both negative.



The ratio is either $\frac{-2}{3}$ or $\frac{3}{2}$

As the sum of the infinite sequence is required, r must be $-1 < r < 1$. Therefore, $r = \frac{-2}{3}$

Using first term $b - 1$ and $r = \frac{-2}{3}$ and $S_\infty = \frac{a}{1-r}$

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