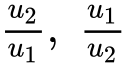
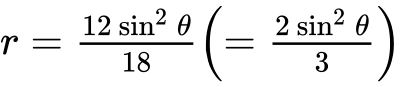
# 1.10 Sum of infinite Geometric sequences

**1a.** *[2 marks]*

## Markscheme

valid approach     ***(M1)***

*eg*   

      ***A1 N2***

***[2 marks]***

**1b.** *[3 marks]*

## Markscheme

recognizing that sin*θ* is bounded      ***(M1)***

*eg*    0 *≤* sin *θ*≤ 1, −1 ≤*sinθ*≤ 1, −1 <*sinθ*< 1

0 < r ≤      ***A2 N3***

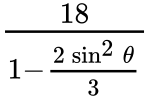
**Note:** If working shown, award ***M1A1*** for correct values with incorrect inequality sign(s).  
If no working shown, award ***N1*** for correct values with incorrect inequality sign(s).

***[3 marks]***

**1c.** *[4 marks]*

## Markscheme

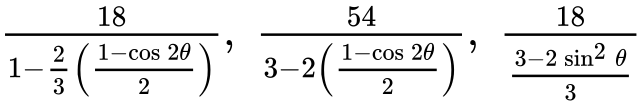
correct substitution into formula for infinite sum       ***A1***

*eg* 

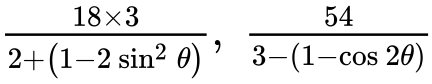
evidence of choosing an appropriate rule for cos 2*θ* (seen anywhere)         ***(M1)***

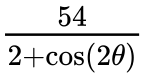
*eg*cos 2*θ* = 1− 2 sin *θ*

correct substitution of identity/working (seen anywhere)      ***(A1)***

*eg*   

correct working that clearly leads to the given answer       ***A1***

*eg*  

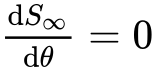
    ***AG N0***

***[4 marks]***

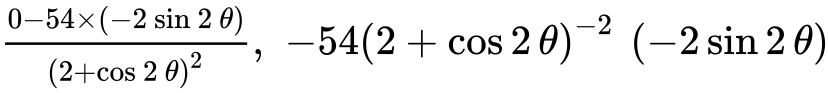
**1d.** *[6 marks]*

## Markscheme

**METHOD 1** (using differentiation)

recognizing  (seen anywhere)       ***(M1)***

finding any correct expression for        ***(A1)***

*eg*

correct working      ***(A1)***

*eg* sin 2*θ* = 0

any correct value for sin(0) (seen anywhere)       ***(A1)***

*eg* 0, , … , sketch of sine curve with *x*-intercept(s) marked both correct values for 2*θ* (ignore additional values)      ***(A1)***

2*θ*= , 3 (accept values in degrees)

both correct answers       ***A1 N4***

**Note:** Award ***A0*** if either or both correct answers are given in degrees.  
Award ***A0***if additional values are given.

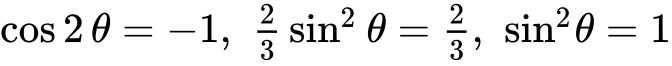
**METHOD 2** (using denominator)

recognizing when S is greatest      ***(M1)***

*eg* 2 + cos 2*θ*is a minimum, 1−*r* is smallest  
correct working      ***(A1)***

*eg*minimum value of 2 + cos 2*θ*is 1, minimum *r* = 

correct working      ***(A1)***

*eg* 

**EITHER** (using cos 2*θ*)

any correct value for cos(−1) (seen anywhere)      ***(A1)***

*eg*, 3, … (accept values in degrees), sketch of cosine curve with *x*-intercept(s) marked

both correct values for 2*θ*(ignore additional values)      ***(A1)***

2*θ*= , 3 (accept values in degrees)

**OR** (using sin*θ*)

sin*θ =*±1     (A1)

sin(1) =  (accept values in degrees) (seen anywhere)      ***A1***

**THEN**

both correct answers        ***A1 N4***

**Note:** Award ***A0*** if either or both correct answers are given in degrees.  
Award ***A0***if additional values are given.

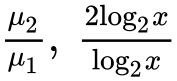
***[6 marks]***

**2a.** *[2 marks]*

## Markscheme

\* This question is from an exam for a previous syllabus, and may contain minor differences in marking or structure.

evidence of dividing terms (in any order)     ***(M1)***

*eg*

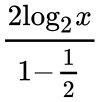
    ***A1     N2***

***[2 marks]***

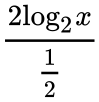
**2b.** *[2 marks]*

## Markscheme

correct substitution     ***(A1)***

*eg*

correct working     ***A1***

*eg*

     ***AG     N0***

***[2 marks]***

**2c.** *[2 marks]*

## Markscheme

correct substitution into the formula for the sum of an arithmetic sequence     ***(A1)***

*eg*

correct working     ***A1***

*eg*

    ***AG     N0***

***[2 marks]***

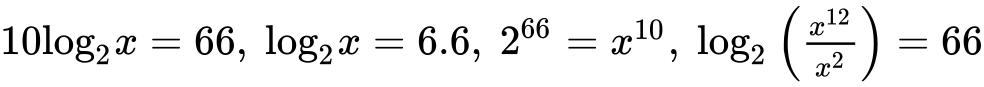
**2d.** *[3 marks]*

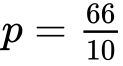
## Markscheme

correct equation     ***(A1)***

*eg*

correct working     ***(A1)***

*eg*

 (accept )     ***A1     N2***

***[3 marks]***

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