10 **(a)** The first three terms of an arithmetic progression are $\sin 3x$, $5\sin 3x$, $9\sin 3x$. Find the exact values of x, where $0 \leqslant x \leqslant \frac{\pi}{2}$, for which the sum to twenty terms is equal to 390. [6]

(b) The first three terms of a geometric progression are $20\cos y$, $10\cos^2 y$, $5\cos^3 y$.

(i) Explain why this progression has a sum to infinity. [2]

(ii) Find the value of y, where y is in radians and $0 < y < 2$, for which the sum to infinity is 9. Give your answer correct to 2 decimal places. [4]

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2022