

**MATH48181/68181: EXTREME VALUES AND FINANCIAL RISK**  
**SEMESTER 1**  
**QUIZ PROBLEM 3**

(Deadline: Tuesday 24 November 2020, 12:00noon)

Consider a class of distributions defined by the cumulative distribution function

$$F(x) = \frac{a^{G(x)} - 1}{(a - 1) \left[ b + \frac{1-b}{a-1} (a^{G(x)} - 1) \right]}$$

where  $a > 0$ ,  $a \neq 1$ ,  $b > 0$  and  $G(\cdot)$  is a valid cumulative distribution function. Show that  $F$  belongs to the same max domain of attraction as  $G$ . You may assume that  $F$  and  $G$  have the same upper end points. Please give full details.

**This problem is worth 1 mark. Marking scheme: 1 mark if the answer is correct, and the derivation is correct and detailed enough; 0.5 mark if the answer is correct, and the derivation is incorrect or not detailed enough; 0.5 mark if the answer is incorrect or not given, but the derivation is correct and detailed enough; 0 mark if the answer is correct, but the derivation is not detailed enough; 0 mark if the answer is incorrect, and the derivation is not detailed enough.**

Please email your solution to [mbbsssn2@manchester.ac.uk](mailto:mbbsssn2@manchester.ac.uk) I will mark your solutions and email your mark, feedback and scanned work to you within 24 hours of the deadline. **PLEASE DO NOT FORGET TO WRITE YOUR FULL NAME AND ID.**