# 13Ma Pure Mini Test <br> Modulus Function, Geometric Series, Radians 

## Question 1



Figure 1
Figure 1 shows a sketch of part of the graph $y=f(x)$, where

$$
f(x)=2|3-x|+5, \quad x \geq 0
$$

(a) State the range of $f(x)$
(b) Solve $f(x)=\frac{1}{2} x+30$

Given that the equation $f(x)=k$, where $k$ is a constant, has two distinct roots,
(c) State the set of possible values for $k$.

## Question 2

The $4^{\text {th }}$ term of a geometric series is 125 and the $7^{\text {th }}$ term is 8 .
(a) Find the common ratio for the series.
(b) Find, to 3 decimal places, the differences between the sum to infinity and the sum of the first 10 terms of this series.

## Question 3



Figure 2

Figure 2 shows a sketch two curves with equations for $0<x \leq 2 \pi$ :

- $y=\tan x$
- $y=5 \cos x$

The curves meet at the points $A$ and $B$, as shown in Figure 2.
(a) Show that the $x$ coordinates of points $A$ and $B$ satisfy the equation

$$
k \sin ^{2} x+\sin x-k=0
$$

where $k$ is a constant to be found.
(b) Hence find, to 2 decimal places, the coordinates of $A$ and $B$.

