

13Ma Pure Mini Test  
Modulus Function, Geometric Series, Radians

**Question 1**

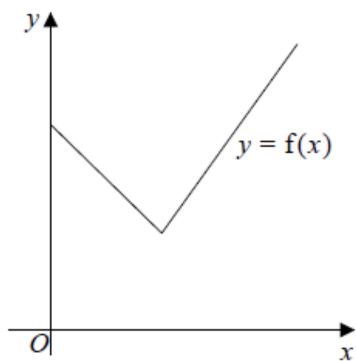


Figure 1

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  $f(x)$

[1]

(b) Solve  $f(x) = \frac{1}{2}x + 30$

[3]

Given that the equation  $f(x) = k$ , where  $k$  is a constant, has two distinct roots,

(c) State the set of possible values for  $k$ .

[2]

## Question 2

The 4<sup>th</sup> term of a geometric series is 125 and the 7<sup>th</sup> term is 8.

(a) Find the common ratio for the series.

[2]

(b) Find, to 3 decimal places, the differences between the sum to infinity and the sum of the first 10 terms of this series.

[4]

### Question 3

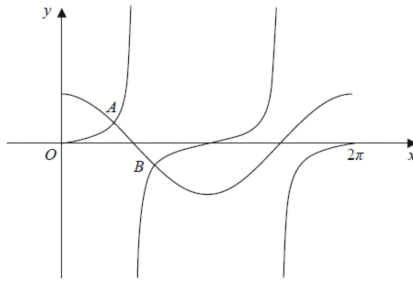


Figure 2

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.

[4]

(b) Hence find, to 2 decimal places, the coordinates of  $A$  and  $B$ .

[4]