

Full Name:

Date:

Year 13 - Short Assessment 1

Time Allowed: 20 minutes

Total Marks: 17

1.

$$f(x) = 12 \cos x - 4 \sin x.$$

Given that $f(x) = R \cos(x + \alpha)$, where $R \geq 0$ and $0 \leq \alpha \leq 90^\circ$,

(a) find the value of R and the value of α .

(4)

(b) Hence solve the equation

$$12 \cos x - 4 \sin x = 7$$

for $0 \leq x < 360^\circ$, giving your answers to one decimal place.

(5)

(c) (i) Write down the minimum value of $12 \cos x - 4 \sin x$.

(1)

(ii) Find, to 2 decimal places, the smallest positive value of x for which this minimum value occurs.

(2)

2.

Show that

$$(i) \quad \frac{\cos 2x}{\cos x + \sin x} \equiv \cos x - \sin x, \quad x \neq (n - \frac{1}{4})\pi, \quad n \in \mathbb{Z}, \quad (2)$$

$$(ii) \quad \frac{1}{2}(\cos 2x - \sin 2x) \equiv \cos^2 x - \cos x \sin x - \frac{1}{2}. \quad (3)$$

- End of Test -