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3 Exam Questions  
Yr 1 – Trigonometric Equations

(1) (a) Show that:

$$\cos^2 x = 3\sin^2 x$$

can be written as  $\tan^2 x = \frac{1}{3}$ .

(b) Hence or otherwise, solve the equation  $\cos^2 2\theta = 3\sin^2 2\theta$  in the interval  $0 \leq \theta \leq 180^\circ$ .

(2) Show that the equation

$$\cos^2 x - 2\sin x - 6 = 0$$

has no real solutions.

(3)  $f(x) = k + \sin(3x)$

where  $k$  is a positive constant.

Given that  $f(x) = 0$  only has one solution in the interval

$$0 \leq x \leq 120^\circ:$$

(a) State the value of  $k$ .

(b) Find the value of  $x$  for which  $f(x) = 0$

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