

TRIGONOMETRY (Q 4 & 5, PAPER 2)

LESSON NO. 7: TRIG EQUATIONS

NOTE: Some questions have a lighter font colour. These questions have been done in previous lessons. However, you may wish to use the results in these questions for solving trig equations.

2001

4 (b) (i) Write $\cos 2x$ in terms of $\sin x$.

(ii) Hence, find all the solutions of the equation $\cos 2x - \sin x = 1$ in the domain $0^\circ \leq x \leq 360^\circ$.

2002

4 (a) Find the value of θ for which $\cos \theta = -\frac{\sqrt{3}}{2}$, $0^\circ \leq \theta \leq 180^\circ$.

4 (b) (i) Use the formula $\sin^2 A = \frac{1}{2}(1 - \cos 2A)$ to express $\sin^2 \frac{1}{2}x$ in terms of $\cos x$.

(ii) Hence, or otherwise, find all the solutions of the equation $\sin^2 \frac{1}{2}x - \cos^2 x = 0$ in the domain $0^\circ \leq \theta \leq 360^\circ$.

2003

4 (b) Find all the solutions of the equation $\sin 2x + \sin x = 0$ in the domain $0^\circ \leq x \leq 360^\circ$.

2004

4 (b) (i) Prove that $\cos 2A = \cos^2 A - \sin^2 A$. Deduce that $\cos 2A = 2\cos^2 A - 1$.

(ii) Hence, or otherwise, find the value of θ for which $2\cos \theta - 7\cos(\frac{\theta}{2}) = 0$, where $0^\circ \leq \theta \leq 360^\circ$. Give your answer correct to the nearest degree.

2005

4 (b) (i) Using $\cos 2A - \cos^2 A - \sin^2 A$, or otherwise, prove $\cos^2 A = \frac{1}{2}(1 + \cos 2A)$.

(ii) Hence, or otherwise, solve the equation $1 + \cos 2x = \cos x$, where $0^\circ \leq x \leq 360^\circ$.

2006

4 (a) Write down the values of A for which $\cos A = \frac{1}{2}$, where $0^\circ \leq A \leq 360^\circ$.

4 (b) (i) Express $\sin(3x + 60^\circ) - \sin x$ as a product of sine and cosine.

(ii) Find all the solutions of the equation $\sin(3x + 60^\circ) - \sin x = 0$, where $0^\circ \leq A \leq 360^\circ$.

ANSWERS

2001 4 (b) (i) $1 - 2\sin^2 x$ (ii) $0^\circ, 180^\circ, 210^\circ, 330^\circ, 360^\circ$

2002 4 (a) 150°

4 (b) (ii) $60^\circ, 180^\circ, 300^\circ$

2003 4 (b) $0^\circ, 120^\circ, 180^\circ, 240^\circ, 360^\circ$

2004 4 (b) (ii) 209°

2005 4 (b) (ii) $60^\circ, 90^\circ, 270^\circ, 300^\circ$

2006 4 (a) $60^\circ, 300^\circ$

4 (b) (i) $2\cos(2x + 30^\circ)\sin(x + 30^\circ)$ (ii) $30^\circ, 120^\circ, 150^\circ, 210^\circ, 300^\circ, 330^\circ$