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A LEVEL MATHS

(54) Solving Basic Trigonometric Equations

WORKING AT D/E

(1) Find the 2 solutions to the equations in the interval $0 \leq x \leq 360$ for each of the following equations:

(a) $\sin(x) = 0.5$
(b) $\cos(x) = 0.5$
(c) $\cos(x) = \frac{\sqrt{3}}{2}$
(d) $\cos(x) = 0$
(e) $\sin(x) = \frac{\sqrt{2}}{2}$

(2) Find the 2 solutions to the equations in the interval $0 \leq x \leq 360$ for each of the following equations. Round answers to 1 decimal place where appropriate.

(a) $\sin(x) = 0.2$
(b) $\cos(x) = \frac{-\sqrt{2}}{2}$
(c) $\cos(x) = 0.65$
(d) $\sin(x) = -0.5$
(e) $\tan(x) = -\sqrt{3}$
(f) $\tan(x) = -2$

(3) Solve the equation $2\sin(x) - 1 = 0$ for $0 < x < 720$

WORKING AT B/C

(1) Solve each equation for $-180 \leq x \leq 180$ giving answers to 1 decimal place where appropriate. For the equations with no solutions, explain why there are no solutions.

(a) $4\sin(x) = 2$
(b) $\cos(x) + 1 = 0.5$
(c) $5\cos(x) = 1$
(d) $3 + \cos(x) = 0$
(e) $2\sin(x) = -\sqrt{3}$
(f) $\tan(x) + 2 = 1$
(g) $3\tan(x) = -\sqrt{3}$

(2) (a) Write down an identity for $\tan(x)$ involving $\sin(x)$ and $\cos(x)$.

(b) Hence, solve the equation $5\sin(x) = 4\cos(x)$ for $0 \leq x \leq 360$ giving your answers to 1 decimal place.

(3) (a) Write down the number of solutions to the equation $x^2 = 3$

(b) Using your answer to part (a) or otherwise, show that there are 4 solutions to the equation $tan^2x = 3$ for $0 \leq x \leq 360$ giving the value of each.

WORKING AT A*/A

(1) (a) The equation $\sin(x) = a$ has 3 solutions in the interval $-180 \leq x \leq 180$. Write down the value of a

(b) The equation $\sin(x) = b$ has no solutions in the interval $-180 \leq x \leq 180$. Find the value sets of values of b.

(c) The equation $\cos(x) = c$ has 2 solutions in the interval $90 \leq x \leq 270$. Find the value sets of values of c.

(2) Solve the equation $\frac{cosx}{sinx} = 0.1$ for $-180 \leq x \leq 180$ giving your answers to 1 decimal place.

(3) (a) Write down the number or solutions to the equation $ksin(x) = k$ where k is a positive constant for $90 < x \leq 360$

(b) The equation $\cos(x) = p$ where p is a constant has no solutions for $-90 \leq x \leq 90$. Find the set of values of p

(c) Find the maximum number of solutions to the equation $cos^2x = n$ where n is a positive content for $0 < x \leq 360$

(d) How many solutions are there to the equation $\tan(x) = r$ where r is a negative constant in the interval $0 \leq x \leq 360$?