Teaching notes

Cut out the cards. Students have to put them in order to solve each of the following four equations for $0^0 < x^0 < 360^0$.

$$3 \sin 2x = \sin x$$

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

$$6 \cos 2x - 7 \sin x + 6 = 0$$

$$6 \cos 2x - 7 \cos x + 6 = 0$$

The document contains two differentiated versions.

The version on pages 2 and 3 has six groups of four cards and students must include one card from each group, in alphabetical order, to create their solutions.

The version on pages 4 and 5 has a mix of all cards.

A	$3(2\sin x\ \cos x) = \sin x$
A	$6(2\cos^2 x - 1) - 7\ \cos x + 6 = 0$
A	$3(2\sin x\ \cos x) = \cos x$
A	$6(1 - 2\sin^2 x) - 7\ \sin x + 6 = 0$

B	$12\cos^2 x\ - 7\cos x = 0$
B	$6\sin x\ \cos x = \sin x$
B	$12\sin^2 x\ + 7\sin x - 12 = 0$
B	$6\sin x\ \cos x = \cos x$

C	$6\sin x\ \cos x - \sin x = 0$
C	$(4\sin x - 3)(3\sin x + 4) = 0$
C	$6\sin x\ \cos x - \cos x = 0$
C	$\cos x(12\cos x - 7) = 0$

D	$\sin x(6\cos x - 1) = 0$
D	$\cos x = 0$ $\quad$ $12\cos x - 7 = 0$
D	$4\sin x - 3 = 0$ $\quad$ $3\sin x + 4 = 0$
D	$\cos x(6\sin x - 1) = 0$

E	$\sin x = 0$ $\quad$ $\cos x = \frac{1}{6}$
E	$\cos x = 0$ $\quad$ $\sin x = \frac{1}{6}$
E	$\sin x = \frac{3}{4}$ $\quad$ $\sin x = -\frac{4}{3}$
E	$\cos x = 0$ $\quad$ $\cos x = \frac{7}{12}$

F	$x = 80.4°, 180°, 279.6°$
F	$x = 9.6°, 90°, 170.4°, 270°$
F	$x = 48.6°, 131.4°$
F	$x = 54.3°, 90°, 270°, 305.7°$

$\cos x(6\sin x - 1) = 0$

$x = 54.3°, 90°, 270°, 305.7°$

$3(2\sin x\ \cos x) = \cos x$

$12\cos^2 x\ - 7\cos x = 0$

$\cos x = 0 \qquad \sin x = \frac{1}{6}$

$6(1 - 2\sin^2 x) - 7\ \sin x + 6 = 0$

$4\sin x - 3 = 0 \qquad 3\sin x + 4 = 0$

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

$x = 9.6°, 90°, 170.4°, 270°$

$3(2\sin x\ \cos x) = \sin x$

$6\sin x\ \cos x = \sin x$

$\sin x = \frac{3}{4} \qquad \sin x = -\frac{4}{3}$

$\cos x = 0$ $12\cos x - 7 = 0$

$6(2\cos^2 x - 1) - 7\cos x + 6 = 0$

$x = 48.6°, 131.4°$

$6\sin x \cos x = \cos x$

$\cos x = 0$ $\cos x = \frac{7}{12}$

$12\sin^2 x + 7\sin x - 12 = 0$

$x = 80.4°, 180°, 279.6°$

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

$\cos x(12\cos x - 7) = 0$

$\sin x = 0$ $\cos x = \frac{1}{6}$

$(4\sin x - 3)(3\sin x + 4) = 0$

$\sin x(6\cos x - 1) = 0$

Answers

1. $\mathbf{3\sin 2x = \sin x}$

$3(2\sin x\ \cos x) = \sin x$

$6\sin x\ \cos x = \sin x$

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

$\sin x(6\cos x - 1) = 0$

$\sin x = 0 \qquad \cos x = \frac{1}{6}$

$x = 80.4°, 180°, 279.6°$

2. $\mathbf{3\sin 2x = \cos x}$

$3(2\sin x\ \cos x) = \cos x$

$6\sin x\ \cos x = \cos x$

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

$\cos x(6\sin x - 1) = 0$

$\cos x = 0 \qquad \sin x = \frac{1}{6}$

$x = 9.6°, 90°, 170.4°, 270°$

3. $\mathbf{6\cos 2x\ - 7\sin x + 6 = 0}$

$6(1 - 2\sin^2 x) - 7\ \sin x + 6 = 0$

$12\sin^2 x\ + 7\sin x - 12 = 0$

$(4\sin x - 3)(3\sin x + 4) = 0$

$4\sin x - 3 = 0 \qquad 3\sin x + 4 = 0$

$\sin x = \frac{3}{4} \qquad \sin x = -\frac{4}{3}$

$x = 48.6°, 131.4°$

4. $\mathbf{6\cos 2x\ - 7\cos x + 6 = 0}$

$6(2\cos^2 x - 1) - 7\ \cos x + 6 = 0$

$12\cos^2 x\ - 7\cos x = 0$

$\cos x\,(12\cos x - 7) = 0$

$\cos x = 0 \qquad 12\cos x - 7 = 0$

$\cos x = 0 \qquad \cos x = \frac{7}{12}$

$x = 54.3°, 90°, 270°, 305.7°$