

TRIGONOMETRY

- 1** Find all values of x in the interval $0 \leq x \leq 360^\circ$ such that
- a** $\sin x = \frac{1}{2}$ **b** $\tan x = \sqrt{3}$ **c** $\cos x = 0$ **d** $\sin x = -1$
- e** $\cos x = \frac{\sqrt{3}}{2}$ **f** $\sin x = \frac{1}{\sqrt{2}}$ **g** $\tan x = -1$ **h** $\cos x = -\frac{1}{2}$
- i** $\sin x = -\frac{\sqrt{3}}{2}$ **j** $\tan x = \frac{1}{\sqrt{3}}$ **k** $\cos x = -\frac{1}{\sqrt{2}}$ **l** $\tan x = -\sqrt{3}$
- 2** Solve each equation for θ in the interval $0 \leq \theta \leq 360^\circ$ giving your answers to 1 decimal place.
- a** $\cos \theta = 0.4$ **b** $\sin \theta = 0.27$ **c** $\tan \theta = 1.6$ **d** $\sin \theta = 0.813$
- e** $\tan \theta = 0.1$ **f** $\cos \theta = 0.185$ **g** $\sin \theta = -0.6$ **h** $\tan \theta = -0.7$
- i** $\cos \theta = -0.39$ **j** $\tan \theta = -3.4$ **k** $\cos \theta = -0.636$ **l** $\sin \theta = -0.203$
- 3** Solve each equation for x in the interval $0 \leq x \leq 360$.
Give your answers to 1 decimal place where appropriate.
- a** $\sin(x - 60)^\circ = 0.5$ **b** $\tan(x + 30)^\circ = 1$ **c** $\cos(x - 45)^\circ = 0.2$
- d** $\tan(x + 30)^\circ = 0.78$ **e** $\cos(x + 45)^\circ = -0.5$ **f** $\sin(x - 60)^\circ = -0.89$
- g** $\cos(x + 45)^\circ = 0.9$ **h** $\sin(x + 30)^\circ = 0.14$ **i** $\cos(x - 60)^\circ = 0.6$
- j** $\sin(x - 30)^\circ = -0.3$ **k** $\tan(x - 60)^\circ = -1.26$ **l** $\sin 2x^\circ = 0.5$
- m** $\cos 2x^\circ = 0.64$ **n** $\sin 2x^\circ = -0.18$ **o** $\tan 2x^\circ = -2.74$
- p** $\sin \frac{1}{2}x^\circ = 0.703$ **q** $\tan 3x^\circ = 0.591$ **r** $\cos 2x^\circ = -0.415$
- 4** Solve each equation for x in the interval $0 \leq x \leq 2\pi$ giving your answers in terms of π .
- a** $\sin x = 0$ **b** $\cos x = \frac{1}{2}$ **c** $\tan x = 1$
- d** $\cos x = -1$ **e** $\tan x = -\frac{1}{\sqrt{3}}$ **f** $\sin x = -\frac{1}{\sqrt{2}}$
- g** $\tan(x + \frac{\pi}{6}) = \sqrt{3}$ **h** $\sin(x - \frac{\pi}{4}) = \frac{1}{2}$ **i** $\cos(x + \frac{\pi}{3}) = -\frac{\sqrt{3}}{2}$
- j** $\sin(x + \frac{\pi}{3}) = \frac{1}{\sqrt{2}}$ **k** $\cos 2x = -\frac{1}{\sqrt{2}}$ **l** $\tan 3x = \frac{1}{\sqrt{3}}$
- 5** Solve each equation for θ in the interval $-180^\circ \leq \theta \leq 180^\circ$.
Give your answers to 1 decimal place where appropriate.
- a** $\cos \theta = 0$ **b** $\tan 2\theta + 1 = 0$ **c** $\sin(\theta + 60^\circ) = 0.291$
- d** $2 \tan(\theta - 15^\circ) = 3.7$ **e** $\sin 2\theta - 0.3 = 0$ **f** $4 \cos 3\theta = 2$
- g** $1 + \sin(\theta + 110^\circ) = 0$ **h** $5 \cos(\theta - 27^\circ) = 3$ **i** $7 - 3 \tan \theta = 0$
- j** $3 + 8 \cos 2\theta = 0$ **k** $2 + 6 \tan(\theta + 92^\circ) = 0$ **l** $1 - 4 \sin \frac{1}{3}\theta = 0$

- 6** Solve each equation for x in the interval $0 \leq x \leq 180^\circ$.
Give your answers to 1 decimal place where appropriate.
- a** $\tan(2x + 30^\circ) = 1$ **b** $\sin(2x - 15^\circ) = 0$ **c** $\cos(2x + 70^\circ) = 0.5$
d $\sin(2x + 210^\circ) = 0.26$ **e** $\cos(2x - 38^\circ) = -0.64$ **f** $\tan(2x - 56^\circ) = -0.32$
g $\cos(3x - 24^\circ) = 0.733$ **h** $\tan(3x + 60^\circ) = -1.9$ **i** $\sin(\frac{1}{2}x + 18^\circ) = 0.572$
- 7** Solve each equation for x in the interval $0 \leq x \leq 2\pi$, giving your answers to 2 decimal places.
- a** $\tan x = 0.52$ **b** $\cos 2x = 0.315$ **c** $\sin(x + \frac{\pi}{4}) = 0.7$
d $3 \cos x + 1 = 0$ **e** $\sin \frac{1}{2}x = 0.09$ **f** $\tan 2x = -0.225$
g $3 - 4 \sin(x - \frac{\pi}{3}) = 0$ **h** $\tan(2x + \frac{\pi}{6}) = 2$ **i** $\cos 3x = -0.81$
j $5 + 3 \tan x = 0$ **k** $\cos(2x - \frac{\pi}{2}) = -0.34$ **l** $1 + 6 \sin 2x = 0$
- 8** **a** Solve the equation

$$2y^2 - 3y + 1 = 0.$$
b Hence, find the values of x in the interval $0 \leq x \leq 360^\circ$ for which

$$2 \sin^2 x - 3 \sin x + 1 = 0.$$
- 9** Solve each equation for θ in the interval $0 \leq \theta \leq 360$.
Give your answers to 1 decimal place where appropriate.
- a** $\sin^2 \theta^\circ = 0.75$ **b** $1 - \tan^2 \theta^\circ = 0$
c $2 \cos^2 \theta^\circ + \cos \theta^\circ = 0$ **d** $\sin \theta^\circ(4 \cos \theta^\circ - 1) = 0$
e $4 \sin \theta^\circ = \sin \theta^\circ \tan \theta^\circ$ **f** $(2 \cos \theta^\circ - 1)(\cos \theta^\circ + 1) = 0$
g $\tan^2 \theta^\circ - 3 \tan \theta^\circ + 2 = 0$ **h** $3 \sin^2 \theta^\circ - 7 \sin \theta^\circ + 2 = 0$
i $\tan^2 \theta^\circ - \tan \theta^\circ = 6$ **j** $6 \cos^2 \theta^\circ - \cos \theta^\circ - 2 = 0$
k $4 \sin^2 \theta^\circ + 3 = 8 \sin \theta^\circ$ **l** $\cos^2 \theta^\circ + 2 \cos \theta^\circ - 1 = 0$
m $\tan^2 \theta^\circ + 3 \tan \theta^\circ - 1 = 0$ **n** $3 \sin^2 \theta^\circ + \sin \theta^\circ = 1$
- 10** **a** Sketch the curve $y = \cos x^\circ$ for x in the interval $0 \leq x \leq 360$.
b Sketch on the same diagram the curve $y = \cos(x + 90)^\circ$ for x in the interval $0 \leq x \leq 360$.
c Using your diagram, find all values of x in the interval $0 \leq x \leq 360$ for which

$$\cos x^\circ = \cos(x + 90)^\circ.$$
- 11** **a** Sketch the curves $y = \cos x^\circ$ and $y = \cos 3x^\circ$ on the same set of axes for x in the interval $0 \leq x \leq 360$.
b Solve, for x in the interval $0 \leq x \leq 360$, the equation

$$\cos x^\circ = \cos 3x^\circ.$$
c Hence solve, for x in the interval $0 \leq x \leq 180$, the equation

$$\cos 2x^\circ = \cos 6x^\circ.$$