1 $f(x) \equiv \sin x,\ x \in \mathbb{R},\ -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$.

a State the range of f.

b Define the inverse function $f^{-1}(x)$ and state its domain.

c Sketch on the same diagram the graphs of $y = f(x)$ and $y = f^{-1}(x)$.

2 Find, in radians in terms of π, the value of

a arcsin 0 **b** $\arcsin \frac{1}{\sqrt{2}}$ **c** arcsin (–1) **d** $\arcsin\left(-\frac{\sqrt{3}}{2}\right)$

3 $g(x) \equiv \cos x,\ x \in \mathbb{R},\ 0 \leq x \leq \pi$.

a Define the inverse function $g^{-1}(x)$ and state its domain.

b Sketch on the same diagram the graphs of $y = g(x)$ and $y = g^{-1}(x)$.

4 $h(x) \equiv \tan x,\ x \in \mathbb{R},\ -\frac{\pi}{2} < x < \frac{\pi}{2}$.

a Define the inverse function $h^{-1}(x)$ and state its domain.

b Sketch on the same diagram the graphs of $y = h(x)$ and $y = h^{-1}(x)$.

5 Find, in radians in terms of π, the value of

a arccos 1 **b** $\arctan \sqrt{3}$ **c** $\arccos \frac{\sqrt{3}}{2}$ **d** $\arcsin\left(-\frac{1}{2}\right)$

e arctan (–1) **f** arccos (–1) **g** $\arctan\left(-\frac{1}{\sqrt{3}}\right)$ **h** $\arccos\left(-\frac{1}{\sqrt{2}}\right)$

6 Find, in radians to 2 decimal places, the value of

a arcsin 0.6 **b** arccos 0.152 **c** arctan 4.7 **d** arcsin (–0.38)

e arccos 0.92 **f** arctan (–0.46) **g** arcsin (–0.506) **h** arccos (–0.75)

7 Solve

a $\arcsin x = \frac{\pi}{4}$ **b** $\arccos x = 0$ **c** $\arctan x = -\frac{\pi}{3}$

d $\arccos 2x = \frac{\pi}{6}$ **e** $\frac{\pi}{4} - \arctan x = 0$ **f** $6 \arcsin x + \pi = 0$

8 Solve each equation, giving your answers to 3 significant figures.

a $\arccos x = 2$ **b** $\arcsin x = -0.7$ **c** $\arctan 3x = 0.96$

d $1 - \arcsin x = 0$ **e** $2 + 3 \arctan x = 0$ **f** $3 - \arccos 2x = 0$

9 $f(x) \equiv \arccos x - \frac{\pi}{3},\ x \in \mathbb{R},\ -1 \leq x \leq 1$.

a State the value of $f(-\frac{1}{2})$ in terms of π.

b Solve the equation $f(x) = 0$.

c Define the inverse function $f^{-1}(x)$ and state its domain.