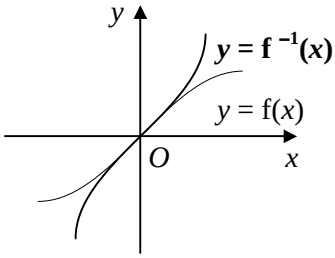
TRIGONOMETRY — *Answers*

1 **a** $-1 \le f(x) \le 1$

b $f^{-1}(x) \equiv \arcsin x,\ x \in \mathbb{R},\ -1 \le x \le 1$

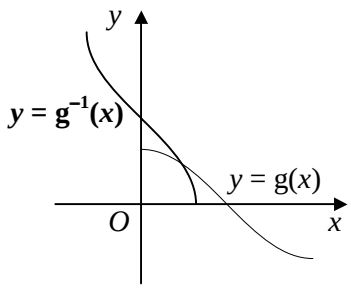
c



2 **a** 0 **b** $\frac{\pi}{4}$ **c** $-\frac{\pi}{2}$ **d** $-\frac{\pi}{3}$

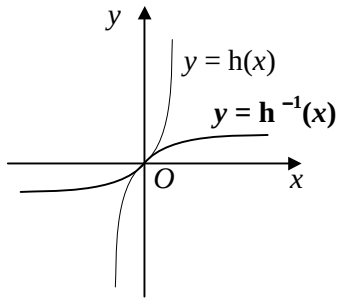
3 **a** $g^{-1}(x) \equiv \arccos x,\ x \in \mathbb{R},\ -1 \le x \le 1$

b



4 **a** $h^{-1}(x) \equiv \arctan x,\ x \in \mathbb{R}$

b



5 **a** 0 **b** $\frac{\pi}{3}$ **c** $\frac{\pi}{6}$ **d** $-\frac{\pi}{6}$

e $-\frac{\pi}{4}$ **f** π **g** $-\frac{\pi}{6}$ **h** $\frac{3\pi}{4}$

6 **a** 0.64 **b** 1.42 **c** 1.36 **d** –0.39

e 0.40 **f** –0.43 **g** –0.53 **h** 2.42

7 **a** $x = \sin\frac{\pi}{4} = \frac{1}{\sqrt{2}}$

b $x = \cos 0 = 1$

c $x = \tan(-\frac{\pi}{3}) = -\sqrt{3}$

d $2x = \cos\frac{\pi}{6} = \frac{\sqrt{3}}{2}$

$x = \frac{\sqrt{3}}{4}$

e $\arctan x = \frac{\pi}{4}$

$x = \tan\frac{\pi}{4} = 1$

f $\arcsin x = -\frac{\pi}{6}$

$x = \sin(-\frac{\pi}{6}) = -\frac{1}{2}$

8 **a** $x = \cos 2 = -0.416$

b $x = \sin(-0.7) = -0.644$

c $3x = \tan 0.96 = 1.42836$

$x = 0.476$

d $\arcsin x = 1$

$x = \sin 1 = 0.841$

e $\arctan x = -\frac{2}{3}$

$x = \tan(-\frac{2}{3}) = -0.787$

f $\arccos 2x = 3$

$2x = \cos 3 = -0.98999$

$x = -0.495$

9 **a** $f(-\frac{1}{2}) = \frac{2\pi}{3} - \frac{\pi}{3} = \frac{\pi}{3}$

b $\arccos x = \frac{\pi}{3} \Rightarrow x = \cos\frac{\pi}{3} = \frac{1}{2}$

c $y = \arccos x - \frac{\pi}{3}$ swap $x = \arccos y - \frac{\pi}{3}$

$y = \cos(x + \frac{\pi}{3})$

$f^{-1}(x) \equiv \cos(x + \frac{\pi}{3}),\ x \in \mathbb{R},\ -\frac{\pi}{3} \le x \le \frac{2\pi}{3}$

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