

Exercise walk-through

Inverse Trigonometric Functions ■ 3.9

eXercise

You must be able to

- describe what $\arcsin$, $\arccos$, and $\arctan$ return
- state their restricted **ranges** 值域

Method — Inverse trig functions

- $\arcsin(x)$ = the angle whose sine is x ; range $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$;
- $\arccos(x)$; range $[0, \pi]$;
- $\arctan(x)$; range $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$.

Each inverts its trig function on a restricted domain.

Method — Example

$$\arcsin(1) = \frac{\pi}{2}, \arccos(1) = 0.$$

Practice 2.1 ■ 1 mark

State what $\arcsin(x)$ returns.

Solution 2.1

Worked steps

the angle whose sine is x **B1**.

Practice 2.2 ■ 1 mark

State the range of $\arctan(x)$.

Solution 2.2

Method: Inverse trig functions

Worked steps

$$\left(-\frac{\pi}{2}, \frac{\pi}{2}\right) \text{ B1.}$$

Practice 2.3 ■ 2 marks

Evaluate $\arcsin(1)$ and $\arccos(1)$.

Solution 2.3

Worked steps

$$\arcsin(1) = \frac{\pi}{2}; \arccos(1) = 0 \quad \text{B1} \quad \text{B1}.$$

Exam-style 3.1 ■ 1 mark

$\arcsin(x)$ gives

- A** the sine of x
- B** the angle whose sine is x
- C** $1/\sin x$
- D** $\sin(1/x)$

Solution 3.1

- A the sine of x
- B the angle whose sine is x
- C $1/\sin x$
- D $\sin(1/x)$



Worked steps

B.

Exam-style 3.2 ■ 1 mark

The range of $\arccos(x)$ is

A $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

B $[0, \pi]$

C all real numbers

D $[0, 2\pi]$

Solution 3.2

Method: Inverse trig functions

A $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

B $[0, \pi]$



C all real numbers

D $[0, 2\pi]$

Worked steps

B.

Exam-style 3.3 ■ 1 mark

Evaluate each.

(a) $\arcsin(0)$.

(b) $\arccos(0)$.

(c) $\arctan(1)$.

Solution 3.3

Method: Inverse trig functions

Worked steps

(a) 0 **B1**. (b) $\frac{\pi}{2}$ **B1**. (c) $\frac{\pi}{4}$ **B1**.