Exercise walk-through

Differentiating Inverse Trigonometric Functions ▪ 3.4

eXercise

You must be able to

- state and use the derivatives of $\arcsin x$, $\arccos x$, and $\arctan x$

Method — Inverse trig derivatives

$$\frac{d}{dx}[\arcsin x] = \frac{1}{\sqrt{1-x^2}}, \qquad \frac{d}{dx}[\arccos x] = -\frac{1}{\sqrt{1-x^2}},$$

$$\frac{d}{dx}[\arctan x] = \frac{1}{1+x^2}.$$

Practice 2.1 ▪ 1 mark

State $\frac{d}{dx}[\arcsin x]$.

Solution 2.1

Worked steps

$$\frac{1}{\sqrt{1-x^2}}$$ B1.

Practice 2.2 ▪ 1 mark

State $\frac{d}{dx}[\arctan x]$.

Solution 2.2

Worked steps

$$\frac{1}{1+x^2}$$ B1.

Practice 2.3 ▪ 2 marks

State $\dfrac{d}{dx}[\arccos x]$.

Solution 2.3

Worked steps

$$-\frac{1}{\sqrt{1-x^2}}$$ B1 B1.

Exam-style 3.1 ▪ 1 mark

$\frac{d}{dx}[\arctan x]$ equals

A $\frac{1}{\sqrt{1-x^2}}$

B $\frac{1}{1+x^2}$

C $-\frac{1}{1+x^2}$

D $\frac{1}{x}$

Solution 3.1

A $\dfrac{1}{\sqrt{1-x^2}}$

B $\dfrac{1}{1+x^2}$ ✓

C $-\dfrac{1}{1+x^2}$

D $\dfrac{1}{x}$

Worked steps

B.

Exam-style 3.2 ▪ 1 mark

$\frac{d}{dx}[\arcsin x]$ equals

A $\frac{1}{1+x^2}$

B $\frac{1}{\sqrt{1-x^2}}$

C $-\frac{1}{\sqrt{1-x^2}}$

D $\arccos x$

Solution 3.2

A $\dfrac{1}{1+x^2}$

B $\dfrac{1}{\sqrt{1-x^2}}$ ✓

C $-\dfrac{1}{\sqrt{1-x^2}}$

D $\arccos x$

Worked steps

B.

Exam-style 3.3 ▪ 1 mark

Differentiate each.

(a) $\arcsin x$.

(b) $\arctan x$.

(c) $\arccos x$.

Solution 3.3

Method: Inverse trig derivatives

Worked steps

(a) $\dfrac{1}{\sqrt{1-x^2}}$ B1. (b) $\dfrac{1}{1+x^2}$ B1. (c) $-\dfrac{1}{\sqrt{1-x^2}}$ B1.