

## 3.4 Differentiating Inverse Trigonometric Functions

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 9 marks

**KEY WORDS** inverse trigonometric functions 反三角函数

### Objective

Build the skills to answer exam questions on **differentiating inverse trigonometric functions**.**You must be able to:**

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

### 1 Worked examples

Study these first. Each one shows the method for a question type used later.

#### ■ Inverse trig derivatives

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

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

### 2 Practice

2.1 State  $\frac{d}{dx}[\arcsin x]$ . [1]

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2.2 State  $\frac{d}{dx}[\arctan x]$ . [1]

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2.3 State  $\frac{d}{dx}[\arccos x]$ . [2]

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### 3 Exam-style questions

3.1  $\frac{d}{dx}[\arctan x]$  equals [1]

- |   |                          |
|---|--------------------------|
| A | $\frac{1}{\sqrt{1-x^2}}$ |
| B | $\frac{1}{1+x^2}$        |
| C | $-\frac{1}{1+x^2}$       |
| D | $\frac{1}{x}$            |

3.2  $\frac{d}{dx}[\arcsin x]$  equals [1]

- |   |                           |
|---|---------------------------|
| A | $\frac{1}{1+x^2}$         |
| B | $\frac{1}{\sqrt{1-x^2}}$  |
| C | $-\frac{1}{\sqrt{1-x^2}}$ |
| D | $\arccos x$               |

3.3 Differentiate each.

(a)  $\arcsin x$ . [1]

(b)  $\arctan x$ . [1]

(c)  $\arccos x$ . [1]