

Exercise walk-through

Derivatives of $\cos x$, $\sin x$, e^x , and $\ln x$ ■ 2.7

eXercise

You must be able to

- state and use these four standard **derivatives** 导数

Method — Key derivatives

$$\frac{d}{dx}[\sin x] = \cos x, \quad \frac{d}{dx}[\cos x] = -\sin x,$$

$$\frac{d}{dx}[e^x] = e^x, \quad \frac{d}{dx}[\ln x] = \frac{1}{x}.$$

Practice 2.1 ■ 1 mark

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

Solution 2.1

Worked steps

 $\cos x$ **B1**.

Practice 2.2 ■ 1 mark

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

Solution 2.2

Worked steps

$$e^x \quad \text{B1}.$$

Practice 2.3 ■ 2 marks

State $\frac{d}{dx}[\cos x]$ and $\frac{d}{dx}[\ln x]$.

Solution 2.3

Worked steps

$$\frac{d}{dx}[\cos x] = -\sin x; \frac{d}{dx}[\ln x] = \frac{1}{x} \quad \text{B1} \quad \text{B1}.$$

Exam-style 3.1 ■ 1 mark

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

A $\sin x$

B $-\sin x$

C $\cos x$

D $-\cos x$

Solution 3.1

A $\sin x$

B $-\sin x$



C $\cos x$

D $-\cos x$

Worked steps

B.

Exam-style 3.2 ■ 1 mark

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

A x

B $\frac{1}{x}$

C $\ln x$

D e^x

Solution 3.2

A x

B $\frac{1}{x}$



C $\ln x$

D e^x

Worked steps

B.

Exam-style 3.3 ■ 1 mark

Differentiate each.

(a) $\sin x$.

(b) e^x .

(c) $\cos x$.

Solution 3.3

Worked steps

(a) $\cos x$ B1. (b) e^x B1. (c) $-\sin x$ B1.