

Exercise walk-through

The Tangent Function ■ 3.8

eXercise

You must be able to

- state the period and **vertical asymptotes** 垂直渐近线 of $y = \tan x$
- evaluate the tangent at simple angles

Method — The tangent function

$$\tan x = \frac{\sin x}{\cos x}.$$

- period π ;
- **vertical asymptotes** where $\cos x = 0$, i.e. $x = \frac{\pi}{2} + n\pi$;
- increasing on each branch.

Method — Example

$\tan 0 = 0$, $\tan \frac{\pi}{4} = 1$, and $\tan \frac{\pi}{2}$ is undefined.

Practice 2.1 ■ 1 mark

State the period of $y = \tan x$.

Solution 2.1

Worked steps

$$\pi \text{ (B1)}.$$

Practice 2.2 ■ 1 mark

State where $\tan x$ has vertical asymptotes.

Solution 2.2

Method: The tangent function

Worked steps

where $\cos x = 0$, i.e. $x = \frac{\pi}{2} + n\pi$ **B1**.

Practice 2.3 ■ 2 marks

Evaluate $\tan 0$ and $\tan \frac{\pi}{4}$.

Solution 2.3

Worked steps

$$\tan 0 = 0; \tan \frac{\pi}{4} = 1 \quad \text{B1} \quad \text{B1}.$$

Exam-style 3.1 ■ 1 mark

The period of $y = \tan x$ is

A π

B 2π

C $\frac{\pi}{2}$

D 4π

Solution 3.1

A π **B** 2π **C** $\frac{\pi}{2}$ **D** 4π **Worked steps****A.**

Exam-style 3.2 ■ 1 mark

$y = \tan x$ has vertical asymptotes where

A $\sin x = 0$

B $\cos x = 0$

C $\tan x = 0$

D $x = 0$

Solution 3.2

Method: The tangent function

A $\sin x = 0$

B $\cos x = 0$



C $\tan x = 0$

D $x = 0$

Worked steps

B.

Exam-style 3.3 ■ 1 mark

Evaluate each.

(a) $\tan 0$.

(b) $\tan \frac{\pi}{4}$.

(c) State whether $\tan \frac{\pi}{2}$ is defined.

Solution 3.3

Worked steps

(a) 0 **B1**. (b) 1 **B1**. (c) undefined **B1**.