

3.8 The Tangent Function

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS vertical asymptotes • period

Objective

Build the skills to answer exam questions on **the tangent function**.

You must be able to:

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

1 Key knowledge and worked examples

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

■ 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.

■ Example

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

2 Practice

2.1 State the period of $y = \tan x$. [1]

2.2 State where $\tan x$ has vertical asymptotes. [1]

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

[2]

3 Exam-style questions

3.1 The period of $y = \tan x$ is

[1]

☐

A π

B 2π

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

D 4π

3.2 $y = \tan x$ has vertical asymptotes where

[1]

☐

A $\sin x = 0$

B $\cos x = 0$

C $\tan x = 0$

D $x = 0$

3.3 Evaluate each.

(a) $\tan 0$.

[1]

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

[1]

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

[1]

Solutions

Each answer shows the steps, then the **result**.

2.1

- π

2.2

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

2.3

- $\tan 0 = 0$; $\tan \frac{\pi}{4} = 1$

3.1 A

- π .

3.2 B

- $\cos x = 0$.

3.3

(a)

- 0

(b)

- 1

(c)

- undefined