

Exercise walk-through

2.10

Finding the Derivatives of Tangent, Cotangent, Secant, and/or Cosecant Functions

AP Calculus AB

You must be able to

- state and use the derivatives of the four remaining **trigonometric functions**

1

The method

Method — More trig derivatives

$$\frac{d}{dx}[\tan x] = \sec^2 x, \quad \frac{d}{dx}[\cot x] = -\csc^2 x,$$

$$\frac{d}{dx}[\sec x] = \sec x \tan x, \quad \frac{d}{dx}[\csc x] = -\csc x \cot x.$$

Exercises 2.1·2.3

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

[1]

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

[1]

2.3 State $\frac{d}{dx}[\cot x]$ and $\frac{d}{dx}[\csc x]$.

[2]

Exercises 2.1–2.3

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

2.1

- $\sec^2 x$

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

2.2

- $\sec x \tan x$

2.3 State $\frac{d}{dx}[\cot x]$ and $\frac{d}{dx}[\csc x]$. [2]

2.3

- $\frac{d}{dx}[\cot x] = -\csc^2 x$; $\frac{d}{dx}[\csc x] = -\csc x \cot x$

Exercises 3.1·3.2

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

[1]

☐

A $\sec^2 x$

B $-\csc^2 x$

C $\sec x \tan x$

D $-\sin x$

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

[1]

☐

A $\sec^2 x$

B $\sec x \tan x$

C $-\csc x \cot x$

D $\tan x$

Exercises 3.1-3.2

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

[1]

☐

A $\sec^2 x$

B $-\csc^2 x$

C $\sec x \tan x$

D $-\sin x$

3.1 A

- $\sec^2 x$.

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

[1]

☐

A $\sec^2 x$

B $\sec x \tan x$

C $-\csc x \cot x$

D $\tan x$

3.2 B

- $\sec x \tan x$.

Exercise 3.3 (a)

3.3 Differentiate each.

(a) $\tan x$.

[1]

Exercise 3.3 (a)

3.3 Differentiate each.

(a) $\tan x$.

[1]

(a)

- $\sec^2 x$

Exercise 3.3 (b)

3.3 Differentiate each.

(b) $\cot x$.

[1]

Exercise 3.3 (b)

3.3 Differentiate each.

(b) $\cot x$.

[1]

(b)

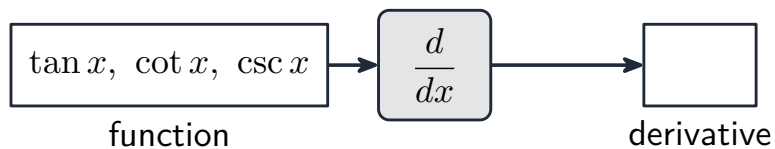
- $-\csc^2 x$

Exercise 3.3 (c)

3.3 Differentiate each.

(c) $\csc x$.

[1]

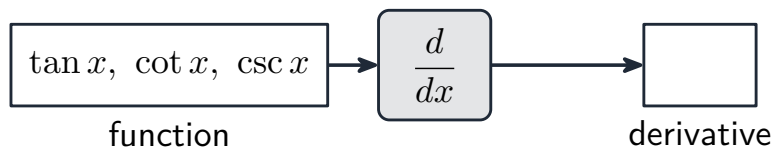


Exercise 3.3 (c)

3.3 Differentiate each.

(c) $\csc x$.

[1]



(c)

- $-\csc x \cot x$