

# Aufgabenblatt Ableitungen

## der trigonometrischen Funktionen

Level 1 – Grundlagen – Blatt 1

Dokument mit 25 Aufgaben

**Aufgabe A1**

Bilde die 1. und 2. Ableitung der gegebenen trigonometrischen Funktionsgleichungen.

$f_n(x)$	$f'_n(x)$	$f''_n(x)$
$f_1(x) = \sin(x)$	$f'_1(x) =$	$f''_1(x) =$
$f_2(x) = 2\sin(x)$	$f'_2(x) =$	$f''_2(x) =$
$f_3(x) = a\sin(x)$	$f'_3(x) =$	$f''_3(x) =$
$f_4(x) = \cos(x)$	$f'_4(x) =$	$f''_4(x) =$
$f_5(x) = 3\cos(x)$	$f'_5(x) =$	$f''_5(x) =$
$f_6(x) = b\cos(x)$	$f'_6(x) =$	$f''_6(x) =$
$f_7(x) = \frac{1}{2}\sin(x) + 3$	$f'_7(x) =$	$f''_7(x) =$
$f_8(x) = \pi\cos(x) - 5$	$f'_8(x) =$	$f''_8(x) =$

**Aufgabe A2**

Bilde die 1. und 2. Ableitung der gegebenen trigonometrischen Funktionsgleichungen.

$f_n(x)$	$f'_n(x)$	$f''_n(x)$
$f_1(x) = 2\sin(x + 2)$	$f'_1(x) =$	$f''_1(x) =$
$f_2(x) = a\sin(x + c)$	$f'_2(x) =$	$f''_2(x) =$
$f_3(x) = \frac{1}{c}\sin(x - 8)$	$f'_3(x) =$	$f''_3(x) =$
$f_4(x) = 0,5\cos(x - 2)$	$f'_4(x) =$	$f''_4(x) =$
$f_5(x) = 4 + \cos(x - 8)$	$f'_5(x) =$	$f''_5(x) =$
$f_6(x) = b\cos(x + \pi)$	$f'_6(x) =$	$f''_6(x) =$
$f_7(t) = \frac{1}{2}\sin\left(\frac{1}{8}t + t\right) - 3$	$f'_7(x) =$	$f''_7(x) =$
$f_8(t) = \pi\cos(t + x) + x$	$f'_8(x) =$	$f''_8(x) =$

**Aufgabe A3**Bestimme  $f'(x)$  und  $f''(x)$ .

- a)  $f(x) = -9\sin(x)$       b)  $f(x) = 5 + \cos(x)$       c)  $f(x) = 5x - \cos(x)$   
 d)  $f(x) = x^2 - \frac{1}{2}\cos(x)$       e)  $f(x) = \frac{1}{x} + \frac{\sin(x)}{2}$       f)  $f(x) = \frac{3}{x^3} + 2\sin(x)$   
 g)  $f(x) = \frac{x^{-3}}{3} - \frac{\cos(x)}{4}$       h)  $f(x) = \frac{3\sin(x)}{4} - \frac{2\cos(x)}{5}$       i)  $f(x) = \sqrt{x} - \frac{1}{8}\sin(x)$

# Differenzialrechnung

## Aufgabenblatt Ableitungen der trigonometrischen Funktionen

Lösungen  
Level 1 – Grundlagen – Blatt 1

### Lösung A1

$f_n(x)$	$f'_n(x)$	$f''_n(x)$
$f_1(x) = \sin(x)$	$f'_1(x) = \cos(x)$	$f''_1(x) = -\sin(x)$
$f_2(x) = 2\sin(x)$	$f'_2(x) = 2\cos(x)$	$f''_2(x) = -2\sin(x)$
$f_3(x) = a\sin(x)$	$f'_3(x) = a\cos(x)$	$f''_3(x) = -a\sin(x)$
$f_4(x) = \cos(x)$	$f'_4(x) = -\sin(x)$	$f''_4(x) = -\cos(x)$
$f_5(x) = 3\cos(x)$	$f'_5(x) = -3\sin(x)$	$f''_5(x) = -3\cos(x)$
$f_6(x) = b\cos(x)$	$f'_6(x) = -b\sin(x)$	$f''_6(x) = -b\cos(x)$
$f_7(x) = \frac{1}{2}\sin(x) + 3$	$f'_7(x) = \frac{1}{2}\cos(x)$	$f''_7(x) = -\frac{1}{2}\sin(x)$
$f_8(x) = \pi\cos(x) - 5$	$f'_8(x) = -\pi\sin(x)$	$f''_8(x) = -\pi\cos(x)$

### Lösung A2

$f_n(x)$	$f'_n(x)$	$f''_n(x)$
$f_1(x) = 2\sin(x + 2)$	$f'_1(x) = 2\cos(x + 2)$	$f''_1(x) = -2\sin(x + 2)$
$f_2(x) = a\sin(x + c)$	$f'_2(x) = a\cos(x + c)$	$f''_2(x) = -a\sin(x + c)$
$f_3(x) = \frac{1}{c}\sin(x - 8)$	$f'_3(x) = \frac{1}{c}\cos(x - 8)$	$f''_3(x) = -\frac{1}{c}\sin(x - 8)$
$f_4(x) = 0,5\cos(x - 2)$	$f'_4(x) = -0,5\sin(x - 2)$	$f''_4(x) = -0,5\cos(x - 2)$
$f_5(x) = 4 + \cos(x - 8)$	$f'_5(x) = -\sin(x - 8)$	$f''_5(x) = -\cos(x - 8)$
$f_6(x) = b\cos(x + \pi)$	$f'_6(x) = -b\sin(x + \pi)$	$f''_6(x) = -b\cos(x + \pi)$
$f_7(t) = \frac{1}{2}\sin\left(\frac{1}{8}t + t\right) - 3$	$f'_7(t) = \frac{1}{2}\cos\left(\frac{1}{8}t + t\right)$	$f''_7(t) = -\frac{1}{2}\sin\left(\frac{1}{8}t + t\right)$
$f_8(t) = \pi\cos(t + x) + x$	$f'_8(t) = -\pi\sin(t + x)$	$f''_8(t) = -\pi\cos(t + x)$

### Lösung A3

- |   |  |  |
|---|--|--|
| a) $f(x) = -9\sin(x)$                       | $f'(x) = -9\cos(x)$                          | $f''(x) = 9\sin(x)$                          |
| b) $f(x) = 5 + \cos(x)$                     | $f'(x) = -\sin(x)$                           | $f''(x) = -\cos(x)$                          |
| c) $f(x) = 5x - \cos(x)$                    | $f'(x) = 5 + \sin(x)$                        | $f''(x) = \cos(x)$                           |
| d) $f(x) = x^2 - \frac{1}{2}\cos(x)$        | $f'(x) = 2x + \frac{1}{2}\sin(x)$            | $f''(x) = 2 + \frac{1}{2}\cos(x)$            |
| e) $f(x) = \frac{1}{x} + \frac{\sin(x)}{2}$ | $f'(x) = -\frac{1}{x^2} + \frac{\cos(x)}{2}$ | $f''(x) = \frac{2}{x^3} - \frac{\sin(x)}{2}$ |
| f) $f(x) = \frac{3}{x^3} + 2\sin(x)$        | $f'(x) = -\frac{9}{x^4} + 2\cos(x)$          | $f''(x) = \frac{36}{x^5} - 2\sin(x)$         |

# Aufgabenblatt Ableitungen der trigonometrischen Funktionen

Lösungen

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g)  $f(x) = \frac{x^{-3}}{3} - \frac{\cos(x)}{4}$

$$f'(x) = -x^{-4} + \frac{\sin(x)}{4} \quad f''(x) = 4x^{-5} + \frac{\cos(x)}{4}$$

h)  $f(x) = \frac{3\sin(x)}{4} - \frac{2\cos(x)}{5}$

$$f'(x) = \frac{3\cos(x)}{4} + \frac{2\sin(x)}{5} \quad f''(x) = -\frac{3\sin(x)}{4} + \frac{2\cos(x)}{5}$$

i)  $f(x) = \sqrt{x} - \frac{1}{8}\sin(x)$

$$f'(x) = \frac{1}{2\sqrt{x}} - \frac{1}{8}\cos(x) \quad f''(x) = -\frac{1}{4x\sqrt{x}} + \frac{1}{8}\sin(x)$$