# HM2 Serie 1 Aufgabe 2

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## a1)

$w(x,t) = \sin(x+ct)$

$\frac{\partial w}{\partial t} = \cos(x+ct) \cdot c$

$\frac{\partial}{\partial t}\left(\frac{\partial w}{\partial t}\right) = -\sin(x+ct) \cdot c^2$

$\frac{\partial v}{\partial x} = \cos(x+ct)$

$\frac{\partial}{\partial x}\left(\frac{\partial v}{\partial x}\right) = -\sin(x+ct)$

Wellengleichung ist erfüllt, da:
$-\sin(x+ct) \cdot c^2 = c^2 \cdot (-\sin(x+ct))$

## a2)

$v(x,t) = \sin(x+ct) + \cos(2x+2ct)$

$\frac{\partial w}{\partial t} = \cos(x+ct) \cdot c - \sin(2x+2ct) \cdot 2c$

$\frac{\partial}{\partial t}\left(\frac{\partial w}{\partial t}\right) = -\sin(x+ct) \cdot c^2 - \cos(2x+2ct) \cdot 4c^2$

$\frac{\partial v}{\partial x} = \cos(x+ct) - \sin(2x+2ct) \cdot 2$

$\frac{\partial}{\partial x}\left(\frac{\partial v}{\partial x}\right) = -\sin(x+ct) - \cos(2x+2ct) \cdot 4$

Wellengleichung ist erfüllt, da:
$-\sin(x+ct) \cdot c^2 - \cos(2x+2ct) \cdot 4c^2 = c^2 \cdot (-\sin(x+ct) - \cos(2x+2ct) \cdot 4))$