Simple Example of AI algorithm
of gradient descent
with Excel

x Input	y_a Output
3	9

model
$y_p = w \cdot x_a$

loss mean squared error
MSE

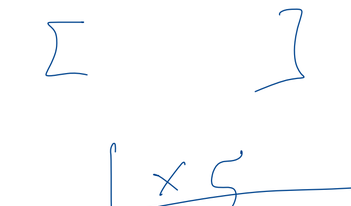
- Pytorch
- Example gradients from simple
  then complex example
- Homework example
  NN architecture with matrices

x Input	y_a Output
3	5

gradient descent

Model
$y_p = (w) x$ $\quad w = \frac{5}{3}$
$\frac{dy_p}{dw} = x$

loss function
MSE
$loss = \frac{\sum^{k} (y_p - y_a)^2}{k}$
$loss = (y_p - y_a)^{(2)}$



$\frac{dloss}{dw} = \underbrace{2(y_p - y_a)}_{\frac{dloss}{dy_p}} \frac{dy_p}{dw}$

$\frac{dy_p}{dw}$

optimum Values for w $\longleftrightarrow$ $\frac{dloss}{dw} = 2(y_p - y_a) x$

Eulers Method
$y_{i+1} = y_i + \frac{dy}{dt} \Delta t$

learning rate
$w_{new} = w_{old} - \frac{dloss}{dw} \cdot l$