# **What is a Derivative ???**

If w goes up by 0.001 i.e w+0.001, then J(w) goes up by 6 times w.  
Graphical user interface, text, application

Description automatically generated

Text

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If w goes up by 0.002 i.e w+0.002, then also J(w) goes up by 6 times w.

Once again there is 6 to 1 ratio,   
between how much w goes up versus how much J(w) goes up.

As-long as epsilon is pretty small   
the ratio by which J(w) goes up versus the amount by which w goes up should be times.

Text

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At a point, we will recognize that the derivative corresponds to the slope of a line that touches the function J(w).

Slope of the line corresponds to the derivative of the function.

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Derivative with respect to w of J(w) 🡪 If w goes up by epsilon, how much does J(w) goes up by the constant k times epsilon. The constant k is the derivative.  
The value of k depends upon w and J(w) .

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# **Computation Graph**

Graphical user interface, application

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Diagram

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Forward Propagation 🡪 Left to Right  
Backward Propagation 🡪 Right to Left

A picture containing diagram

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When w increases by epsilon, J goes down by 4\*epsilon