20181018b Marginals

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### Principles

Let total cost to be TC(q)  
For a small change in q, we need to find the increase or decrease in cost, i.e. marginal costs  
TC’(q) = delta TC / delta q  
then the marginal costs, i.e. delta TC = TC’(q) \* delta q  
When delta q was not given, and q is large, 1 unit would be comparable to delta q  
In this way, delta TC = TC’(q)

### Worked example

library(Ryacas)  
library(mosaic)

Let TC(q) == 50000 + 25*q + 0.001*q^2  
What would be the marginal cost if q = 100 and q = 10000

q = Sym('q')  
f = 50000 + 25\*q + 0.001\*q^2  
df = deriv(f,q)  
df

## expression(0.002 \* q + 25)

# marginal cost  
Eval(df,list(q=c(100,10000)))

## [1] 25.2 45.0