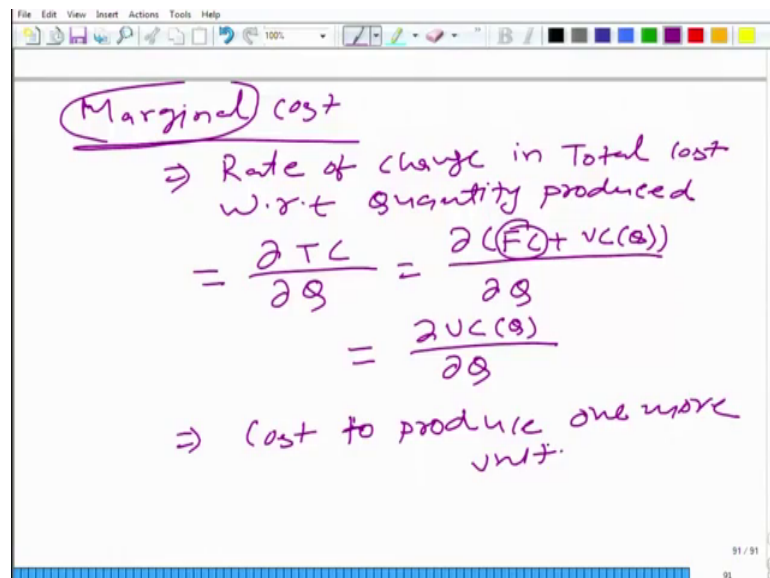


An Introduction to Microeconomics
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Lecture - 99
Cost in Short Run: MC

Now, let us talk about the marginal cost.

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The image shows a whiteboard with handwritten notes in purple ink. The title 'Marginal cost' is circled. Below it, the definition is given as 'Rate of change in Total cost w.r.t quantity produced'. This is followed by the mathematical derivation:
$$= \frac{\partial TC}{\partial Q} = \frac{\partial (FC + VC(Q))}{\partial Q}$$
$$= \frac{\partial VC(Q)}{\partial Q}$$
 Finally, it is defined as 'Cost to produce one more unit'. The whiteboard interface includes a menu bar (File, Edit, View, Insert, Actions, Tools, Help) and a toolbar with various drawing tools. The bottom right corner shows '91 / 91'.

What is marginal cost? The definition is rate of change we have been using these margin the marginal concept again and again. So, rate of change in total cost with respect to with respect to quantity produced. So, basically marginal cost is nothing derivative partial derivative of total cost with respect to quantity produced and let me say let me write it further this is TC is equal to FC plus VC of Q that we have just discussed and fixed cost is something that does not change with the output. So, this is also equal to the partial derivative of variable cost with respect to quantity fine.

Student: Yes sir.

If we do not want to use calculus what would be the definition of marginal cost;

Student: Rate of;

The cost of cost to produce;

Student: One.

More unit.

Student: One more unit.

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Handwritten mathematical derivation on a whiteboard:

$$\begin{aligned} \text{MC}(1) &= \frac{TC(1) - TC(0)}{1 - 0} = \frac{FC + VC(1) - FC - VC(0)}{1} \\ &= VC(1) \\ \text{MC}(2) &= \frac{TC(2) - TC(1)}{2 - 1} = VC(2) - VC(1) \end{aligned}$$

So, what we are saying let us say marginal cost at 1 what we have is this is what we will get and what is this TC of 1 is FC plus VC of 1.

Student: Yes sir.

And what is total cost to produce 0 output.

Student: Plus.

FC.

Student: VC 0.

VC of 0 and VC of 0 is equal to 0.

Student: 0.

So, what do we get? FC-FC gets cancelled.

Student: VC 1.

And what we can write it is VC 1 divided by.

Student: 1.

One and this is average variable cost to produce 1 more unit average variable cost to produce 1 unit of output.

Student: Yeah.

So, marginal cost at 1 is equal to average variable cost, what can we say about marginal cost to produce second unit, when we have any relationship between marginal cost to produce the second unit and the average variable cost of producing 2 units. Notice the language, I say the marginal conduce marginal cost to produce 1 more unit at level 2 because we are moving from 1 to 2, but here we are saying average variable cost to produce 2 units.

Student: 2 units.

Because what we are talking about here is total variable cost or variable cost to produce 2 units divided by 2 can we talk about any relationship here?

Student: Sir, marginal cost of 2 would be marginal cost of 1 2 minus marginal cost of 1 upon 1.

So, what we can do? We can write it like this.

Student: Yes sir.

What is this equal to?

Student: Marginal cost total cost of 2.

Total cost to produce 2 minus total cost to produce.

Student: 1.

1 and what we have here is fixed cost variable cost to produce.

Student: 2.

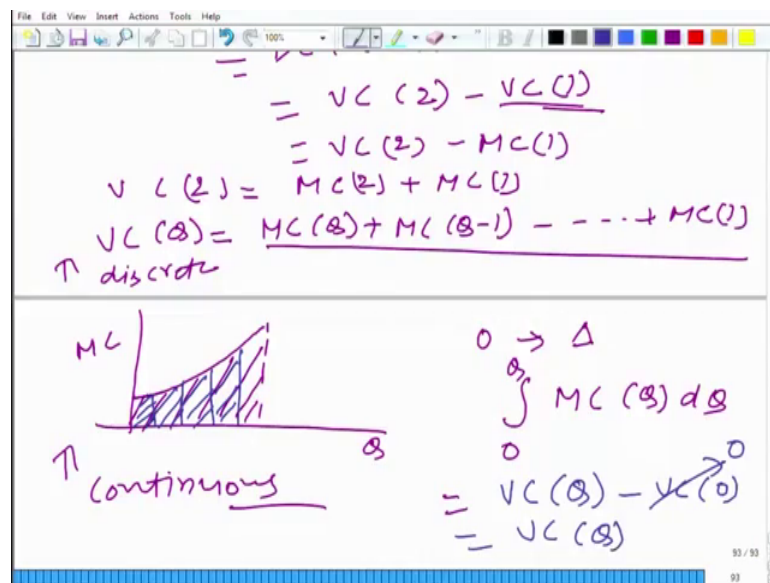
2 units minus fixed cost minus variable cost to produce 1 unit, fine.

Student: Yes sir.

This will get cancelled and what we get here is variable cost to produce the second unit minus variable cost to produce first unit and what is this equal to VC 1 is equal to MC 1.

Student: VC 1.

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Student: Yes sir.

Of course what you said is also right, but here we are more interested this is equal to MC MC 1. So, VC 2 is MC; MC 2 plus mc 1 and similarly how about VC Q can I say it is equal to mc Q plus MC Q minus 1.

Student: Yes sir.

Why.

Student: Sir because the variable cost of producing nth good would be the marginal cost of producing that good starting from 1 like the change individually summing of the;

So, basically what we are saying here we are using the discrete changes.

Student: Yes sir.

Notice here we are using the discrete changes let us look at the marginal cost marginal cost is like this ok, this is the marginal cost and here we have quantity. If we integrate from one to let us take it from 0 because, here now we are using till here we are using discrete and here we have continuous ok, so from 0 we talked about delta change in output and so on. What we have here is; what is this area under curve or in other words, we are integrating it from 0 to Q, we are integrating it from 0 to Q, what would we get if we integrate it from 0 to Q.

Student: Sir that would give the way it will cost.

That why?

Student: Because it is a summation of marginal cost for every good.

So, here what we have done here is we have taken we have broken it into the small part.

Student: Yes sir.

And we have just derived this. This is for one this is for the second and so on if we keep on adding what we will get is variable cost to produce Q unit minus variable cost to produce 0 unit and variable cost to produce 0 unit is 0. So, we end up getting variable cost to produce Q units.