An Introduction to Microeconomics
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Lecture – 134
Monopoly: Example

So, let us take a look at an example in which we have a firm which operates into two different markets.

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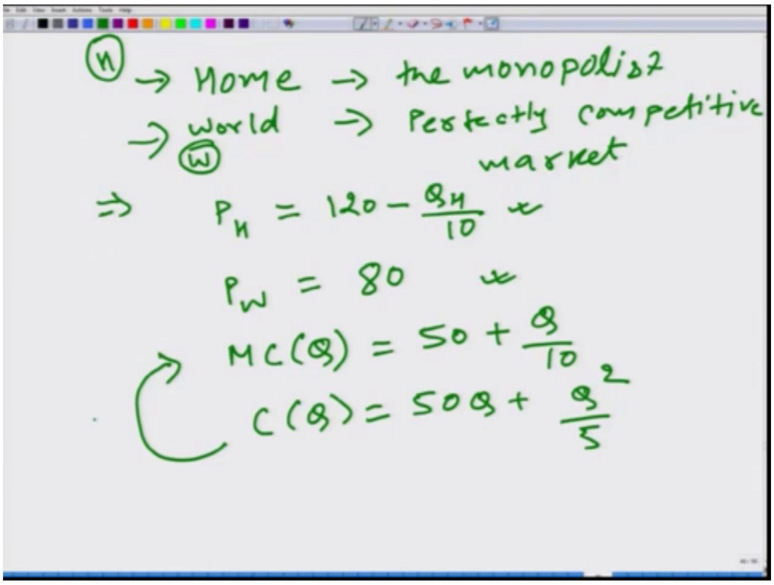

So, let us say the market 1 market is home market and in this market this form acts as the monopolist. The same form is also able to sell its product in the world market and we can assume that there are many forms supplying their product in the world market. So, there it is the market environment is perfectly competitive market.

So, let us say that the demand in home let us say home in short we will denote it by H and world we will denote it by W. So, at home the market demand function is given by P H which is price at home 120 minus Q H by 10 as long as this Q H happens to be less than 1200 otherwise the price would be 0. And in the market world market because it is perfectly competitive let us say the market price is 80.

So, this form is monopolist in home market and one of the many forms in the world market. And let us say that the cost is let us say that the marginal cost to produce Q unit of output is 50 plus Q by 10 or we can say that cost is 50 Q plus Q square by 5 this should give us this marginal cost, ok. So, it is very very clear that there is no fixed cost in this particular problem oh sorry, this should be this should have been 20. Now, it is correct ok.

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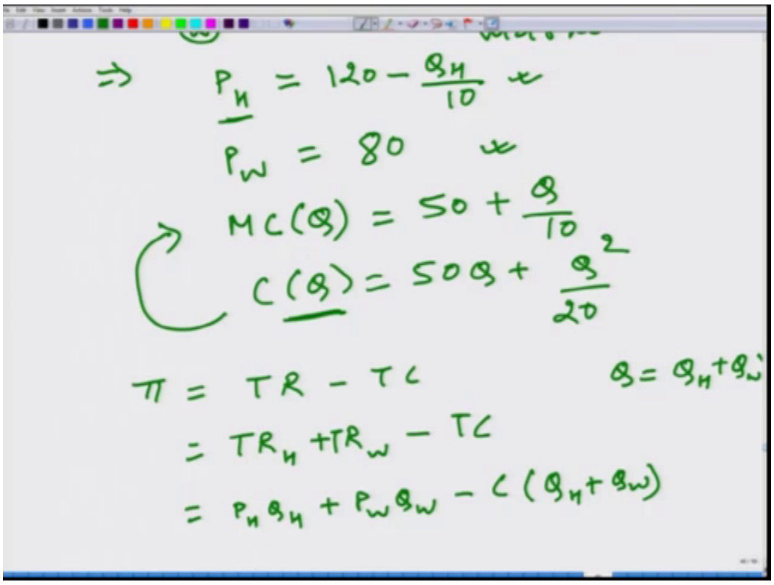

Now, what we need to do is to do the profit maximization for this form. So, what would be the profit maximization profit? First it is going to equal to total revenue minus total cost, but total revenue is coming from two different markets, one is in the home market and another from the world market. A total cost let us say the production takes place in the same factory ok.

So, how much is the total revenue at home? Of course, the unit that it would be able to sell would depend on what is the price of its product in the market. So, it is going to be P H multiplied by Q H, here we are going to have P W multiplied by Q W and minus C of Q which happens to be Q is nothing, but Q H plus Q W, so Q H plus Q W.

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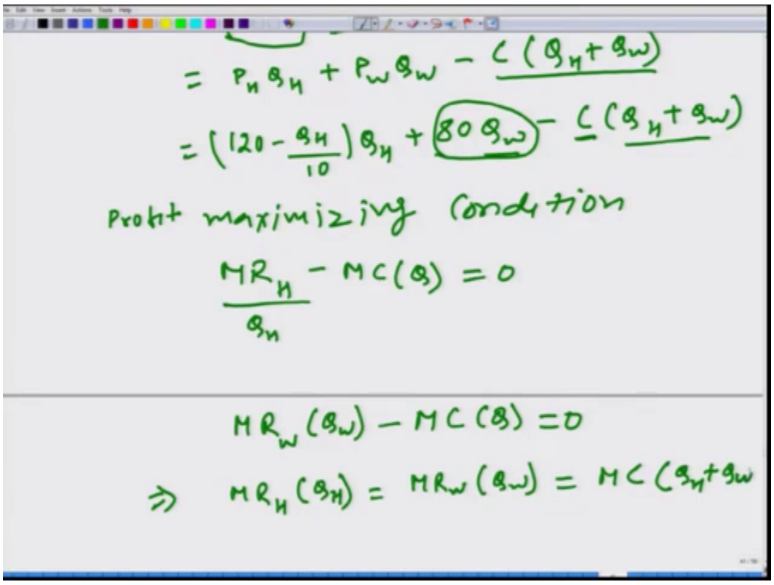

So, let us proceed let us write it. What is P H? P H here is function of quantity. So, this is 120 minus Q H divided by 10 multiplied by Q H. P W is fixed because the world market all the forms are able to sell their product at price 80. So, 80 Q W minus let us keep it as C Q H plus Q W.

Now, this form has to select the amount of Q H as well as of Q W when the form selects Q H and Q W Q gets automatically determined. So, what would be the first order condition? First to obtain the first order condition this profit has to be differentiated with respect to Q H. So, what we get is or in other word what we get if we do that the profit maximizing condition is going to be is going to be marginal revenue in market H because when we differentiate total revenue in market H with respect to H what do we get? We get marginal revenue. It simply means that extra revenue that this firm gets when it produces one more unit.

And this does not depend on Q H. So, when we differentiate this term with respect to Q H we get 0 then we have to differentiate this C with respect to Q H, but notice C is a function of Q H plus Q W. So, what we can do? We can differentiate this C with respect to Q and what do we get? We get marginal cost this we have obtained at Q H, but marginal cost we are obtaining at Q. Why? Because when Q H increases by 1 unit while keeping the Q W fixed Q H plus Q W also increases by 1 unit. So, if we differentiate. So, what we are doing if you are familiar with calculus first we are differentiating C with respect to Q and then again Q with respect to Q H because Q is a simple linear function of Q H what we get here is just one and this should be equal to 0.

We will try to explain this again using without using any calculus. And similarly what we get is MR W at Q W has to be equal to MC of Q it has to be equal to 0 and so therefore, we get MR H at Q H has to be equal to MR W at Q W which has to be equal to MC at Q H plus Q W. So, as we had explained earlier when we had the theoretical construct MR is equal to MC we have explained many times why we are getting MR H is equal to MR W the reason is simple that this form can without changing the Q this form can increase the Q H by decreasing the Q W, ok.

So, if let us say MR H at Q H happens to be more than the marginal revenue in Q world, what this form should do? It should increase the Q H because this would lead to an increase in the profit ok. So, in the equilibrium at the optimal level these two have to be equal, ok.

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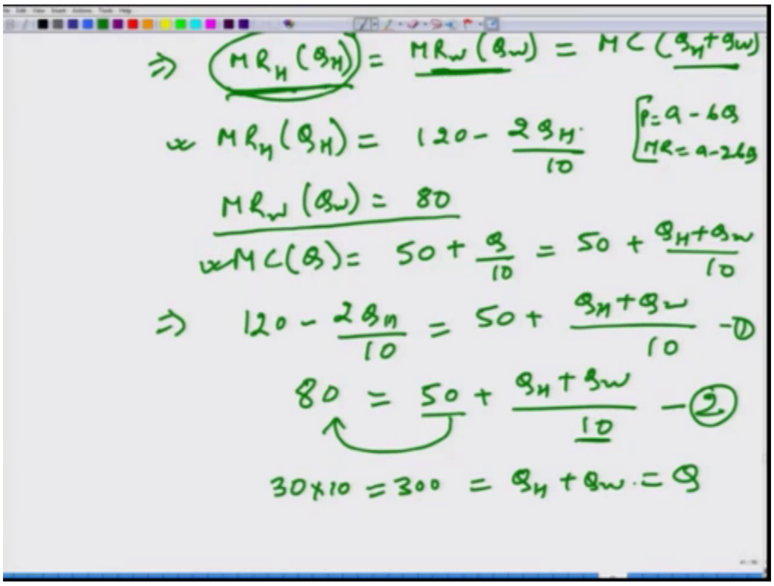

So, let us calculate how much is MR H, this is going to be 120 minus two Q H by W by now we are familiar that when we start with demand function a minus b Q then the MR comes out to be a minus to b Q. So, this is the formula I have used.

What is going to be the marginal revenue in the world market? At all level it is fixed and it is fixed at 80, because it does not matter how many units this firm sells the market price remains at equal to 80. How about the marginal cost? Marginal cost at Q is already given which is 50 plus Q by 10 and if we write Q is equal to Q H plus Q W this is the formulation we get. So, what we have? We have 3 unknowns, 2 unknowns Q H and Q W, and we have two formulation we can use two these two formula to obtain the Q H and Q W. What are those two formula? In the first setting that is the home setting MR marginal revenue at Q H is equal to marginal revenue at Q. So, this is the first formula that we are going to use. Here this has to be equal to this. So, 120 minus 2 Q H divided by 10 has to be equal to 50 plus Q H plus Q W is equal to 10 this is one.

And in the second in the world setting the MR marginal revenue at Q W which turns out to be 80 has to be equal to the same marginal cost 50 plus Q H plus Q W by 10. So, from second equation we can obtain the Q H plus Q W, ok. And how much do we get? If we rearrange this we take this 50 on the left hand side we get 30, and if we multiply it by 10 on both the side we get 300 on the left hand side which is equal to Q H plus Q W which is equal to Q. So, this form will produce a total of 300 units of output.

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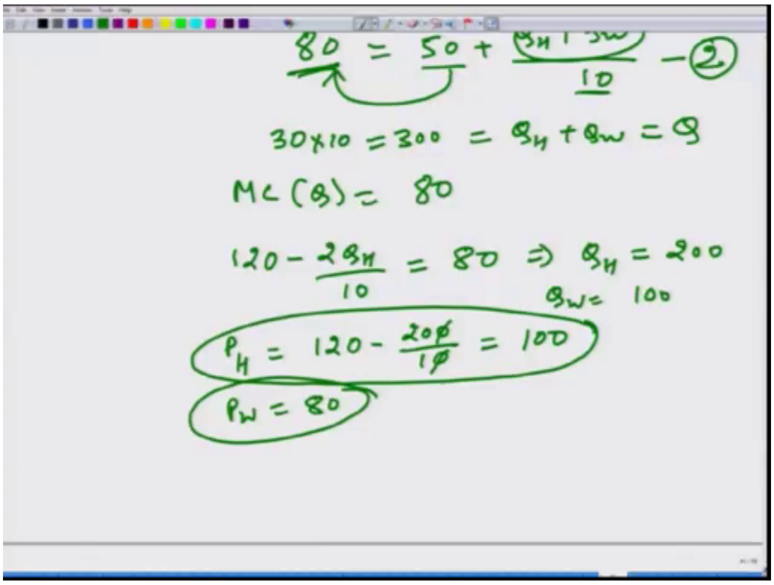

So, at this level of production how much is the marginal cost? We can plug it back the value here or we do not even need to plug it this we have already calculated when we put Q is equal to 300 we are going to get 80. So, this RHS is equal to 80 in the equation number 1. So, we can write rewrite equation number 1 as 120 minus 2 Q H divided by 10 has to be equal to 80, ok. So, it means that Q H has to be equal to 200 and this also gives us the Q W has to be equal to 100 why because Q H plus Q W is 300.

Now, we can calculate the P H P W we already know it is 80. How much is the P H? We can plug the value of Q H in the demand function, and how much is the demand function 120 minus Q H by 10 here Q H is 200, so by 10. This comes out to be 100. So, remember that we had derived that the market which has more elastic demand curve for the firm will have the lower price this is what we get P W is 80 while P H is 100, ok. So, this is just an example numerical example to know how to calculate the forms output and forms prices when the firm is operating in more than one market.

Thank you.