Foundation Course in Managerial Economics
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Lecture - 26
Monopoly - Determination of Price and Quality

Welcome back to our discussion on monopoly. We started with introducing monopoly. We said how does monopoly happen? How does a firm gain the status of a monopolist and we saw that there could be 3 reasons for very broadly there could be 3 reasons because of which a firm can end up being a monopolist.

And so we basically looked at and the 3 reasons that we discussed were it could be the owner of a single it could be the single largest owner of a certain important resource or it could be by law it is a monopolist because it has some patent or copyright or by public directive it is a monopolist or it is possible that it is a natural monopolist where it natural monopoly where it makes sense for the market to have a single large producer who is catering to needs of all the consumers to keep the prices low using economies of scale.

This is what we discussed in the previous class and now today we are going to discuss about determining the price and output. So now that we have a single seller in the market and we know that he is he has some control over price how does he determine the price? How does he determine how much output to produce? How does he determine what price to charge? So these are the questions that we are going to ask in this section.

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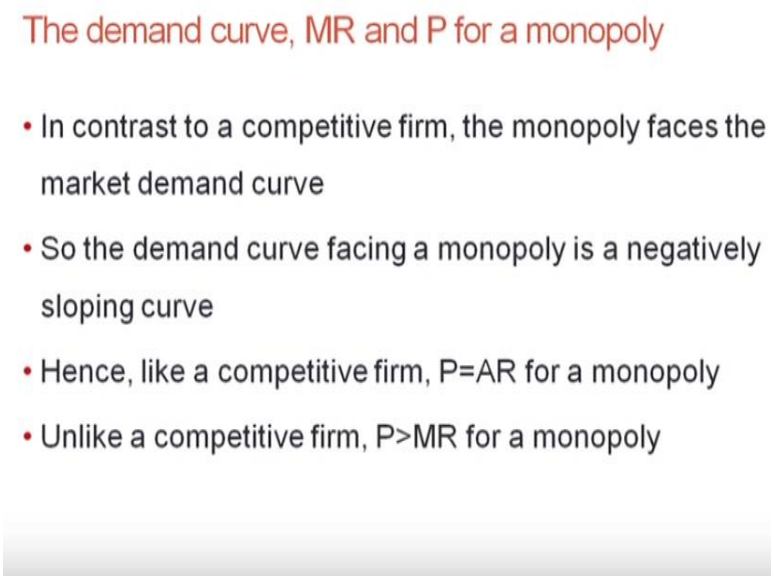

So before we go on to profit maximization we have to familiarize ourselves with the demand curve that the monopoly faces, the marginal revenue, and the price that finally the monopoly charges in the market. So this is the very familiar track that we followed in the case of determining the equilibrium price and output for perfect competition also and that is what we are going to do again for monopoly also. So let us see.

So what is the difference between a competitive firm and a monopoly firm? So in contrast to a competitive firm the monopoly faces the market demand curve. So the monopoly faces the market demand curve. So the demand curve facing a monopoly is a negatively sloping curve. So we all know that from our initial discussion of demand and supply and we have always said that the market demand curve is negatively sloping.

Hence like a competitive firm price is equal to average revenue for a monopoly. However unlike a competitive firm price is actually more than marginal revenue for a monopoly. So let me explain. So let me explain.

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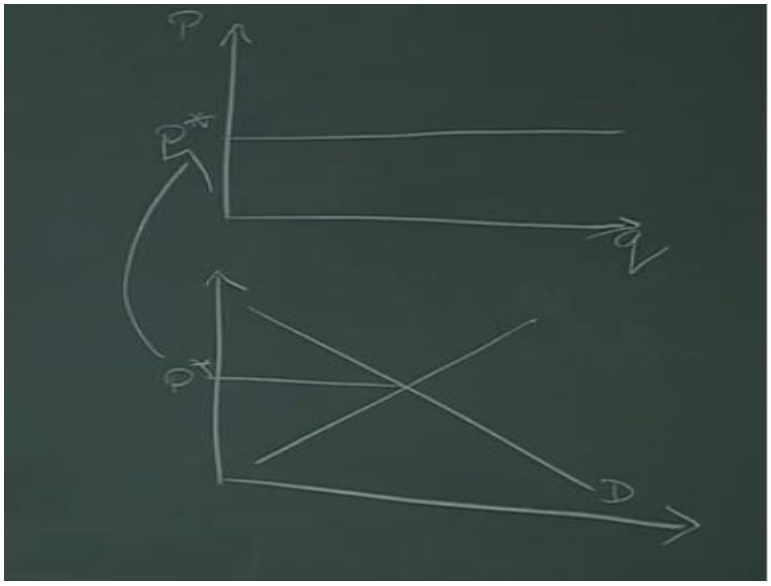

So what we are saying here is if you may remember from our discussion on perfect competition we said that the perfectly competitive firm faces a demand curve which is horizontal. So the for the perfectly competitive firm when it enters the market it knows that it cannot charge price anything other than P star and it knows that at this price any amount could be sold in the market. So this is the demand curve facing the perfectly competitive firm. But that does not mean that the market demand curve is not negatively sloping. So the market demand curve is still negatively sloping and this equilibrium P star is basically this P star in case of a perfectly competitive market.

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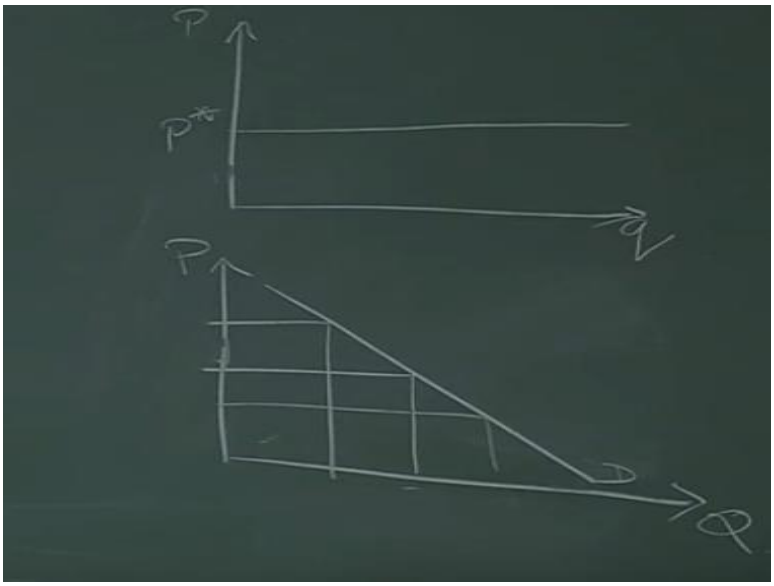

But in case of a monopolist, but in case of a monopolist since he is the single supplier in the market, he is the single seller in the market he faces the market demand curve which is negatively sloping. So he faces this demand curve and for him he has to make a decision along this demand curve where to produce.

That is he knows that if he produces any output here this is the price that he has to charge. If he produces here this is the price that he has to charge. If he produces here this is the price that he has to charge. So this is this is the knowledge to the monopolist that the demand curve is negatively sloping and he just basically has to choose what to produce and how much to produce and what price to charge. So this is the demand curve, is a negatively sloping demand curve for the monopolist.

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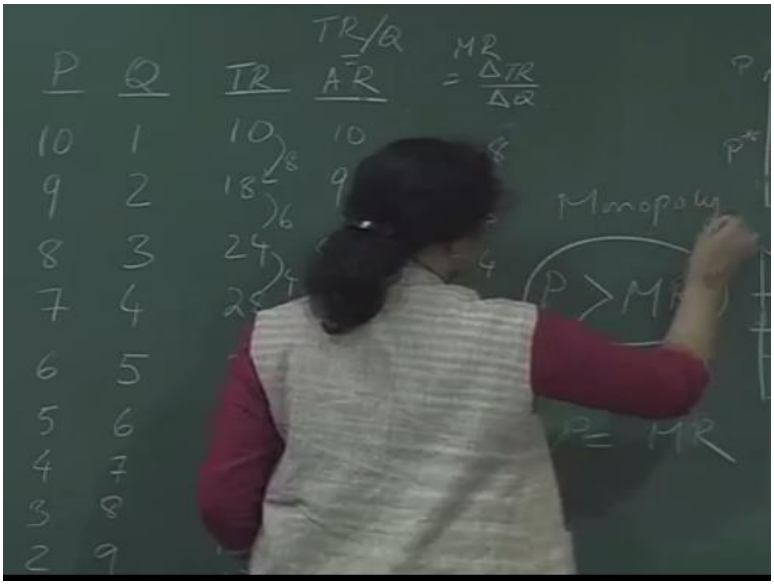

So let us take an example of a very simple demand curve. Say for example the monopolist faces a demand curve where this is the price, the series of prices, quantity. So this is the demand curve. Say price is 10, 9, 8, 7, 6, 5, 4, 3, 2 and 1 and corresponding quantity is say 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10. So as price is falling the quantity demanded is increasing. So this could be a demand curve. So what is the total revenue?

So total revenue is 10, 18, 24, 28, 30, 30, 28, 24, 18 and 10. So this is the total revenue. So we would like to know what is the so you can all see from here that average revenue is price because total revenue divided by quantity is average revenue. So average revenue is always price. So like

perfect competition average revenue is 10, 9, 8, 7, 6, 5, 4, 3, 2 and 1. So average revenue is total revenue by Q is equal to average revenue.

So this is so P is equal to average revenue like in the case of perfect competition. Now what is marginal revenue? So marginal revenue is del TR del Q. So here the change in quantity is 8. Here it is 6. Here it is 4. It is 2, 0, -2, -4, -4, -6, -2, -4, -6 and -8. So marginal revenue is basically 8 let me write it here 8, 6, 4, 2, 0, -2, -4, -6, -8.

So marginal revenue is this. So price so what we see from here is price is actually greater than marginal revenue. So at all the points we are going to see that price is greater than marginal revenue. So price is more than marginal revenue. So this is what we are seeing here in case of monopoly, price is more than marginal revenue while in the case of competition price is perfect competition price is equal to marginal revenue and for a monopoly price is more than marginal revenue. So this is what we see from this example. But what is the intuition? How do we explain this over here? So let me clean the board.

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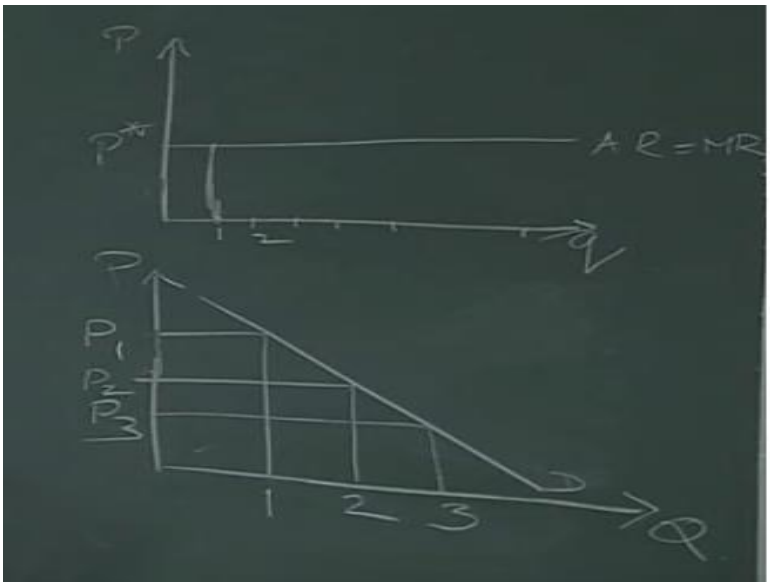

Okay, so the marginal revenue in case of a perfect competition is the marginal revenue in case of perfect competition is this is demand this is demand is AR is equal to MR and why is the marginal revenue equal to price? So imagine that this is 1, this is 2 and so basically when that the next unit of output that the seller sells if the producer decides that I am going to sell or produce additional one more unit of output he sells that additional unit for price P for price P star because the demand is a horizontal line.

So no matter what he sells till what amount he sells every unit that he sells he sells that additional unit for price P star and the revenue that he gets out of selling one additional unit which is actually the marginal revenue so the amount that he gets out of selling one additional unit or marginal revenue is equal to P star or the price.

So that is the reason that price is equal to marginal revenue in case of a perfect competition. But what happens in the case of the monopolist. Now in the case of monopoly what happens is say this is the first unit, this is the second unit, and this is the third unit. Now when the monopolist is charging price P 1 for the first unit, for the second unit if now he decides that I am going to produce one more unit and sell it in the market how much does he get for each of his units. He does not get P 1 because as soon as he increases the units that he is selling in the market as soon as he sells 2 units his price falls to P 2.

Similarly when he reduces his when he sells the next unit or the third unit his price falls to P 3 and when the price falls when he is selling the third unit and the price falls to P 3 he is not selling the third unit only for P 3. He is selling all the 3 units at price P 3. So there his marginal revenue goes down when he sells an additional unit his marginal revenue is going to may go down actually.

So that is the difference between the perfect competition and monopoly is that for the monopolist he has a decision to make. For the perfectly competitive firm he does not worry he does not have to worry about marginal revenue. He knows that marginal revenue is going to be P no matter what like the no matter how many units he sells in the market his marginal revenue is always going to be P.

But in case of the monopolist he knows that if he keeps on increasing the units of output his price is going to go down and down and his marginal revenue is also going to change. So the marginal revenue is not same for him at all the for all the units that he sells. So there is a decision to be made for the monopolist. So let us explain a little more. So more on the monopolist's marginal revenue.

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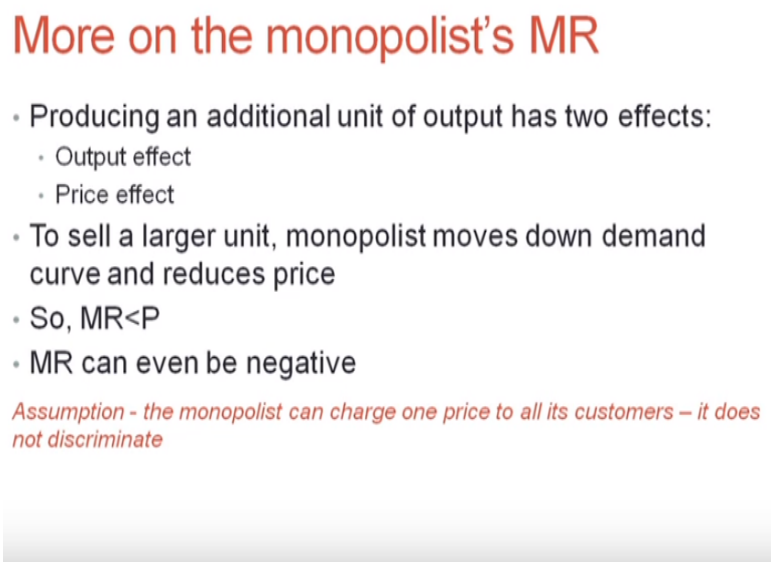

So producing an additional unit of output has 2 effects that is the output effect and the price effect. Let me explain. Let me explain.

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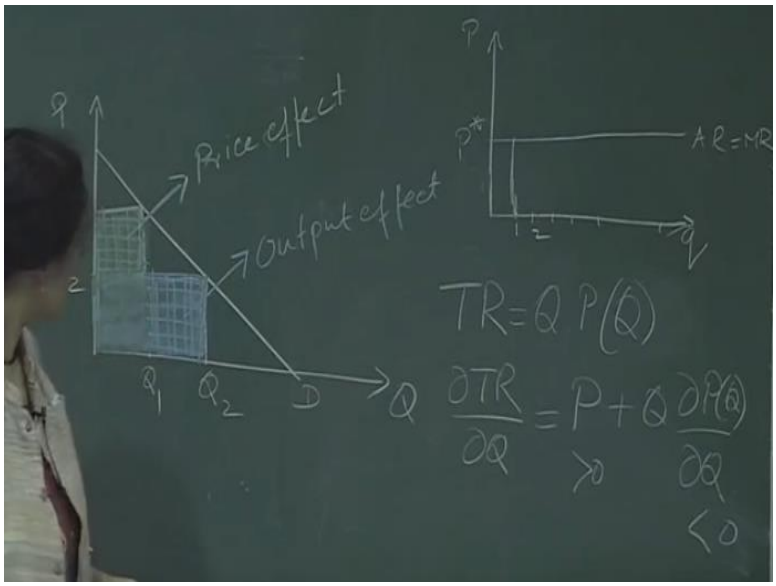

So here is the monopolist's demand curve and say he is charging a price P 1 to produce Q 1. Then he decides to increase his output to Q 2. So if he decides that I am going to sell Q 2 instead of Q 1 immediately his price falls to P 2 for not only Q 2 but for all the units before Q 2. So the entire amount everything he has to now sell at price P 2.

So the price, so when we say output effect and price effect so as soon as the unit of output is increased so there is a the new revenue is this let me, so the earlier what was the revenue that he was getting? He was getting this revenue. So this was the revenue that he was getting from this

was the revenue that he was getting earlier P 1 Q 1 and now that the revenue that he earns by increasing his output to Q 2 is this. So he gets this is the revenue that he earns now. So this is the revenue that he earns now. So what is happening here? He is losing this revenue.

He is losing this rectangle here and he is gaining this revenue the blue rectangle here. So he is gaining this rectangle and he is losing this rectangle. So this part this part is his price effect that is price has fallen and this is what he is losing and this is the output effect that is output has increased and hence his revenue has increased. So this is what happens.

This is the dilemma that the monopolist faces because he has a negatively sloping demand curve and to show it so let me show it mathematically also. So let me show it mathematically also. Say total revenue is equal to P into Q. Total revenue is P into Q and so del TR del Q del TR del Q because which is marginal revenue is equal to P + Q into del P del Q. So why are we having del P del Q here because is now a function of output.

So we have let me write it this way. So P is a function of Q. Since we have a negatively sloping demand curve so price is a function of Q and marginal revenue is equal to P + Q del P del Q. Now in this entire expression P is always positive. Price cannot be negative. So P is always positive. So this is greater than 0. What about this term?

Now this term del P del Q is always negative. Why is it negative because the demand curve is negatively sloping. The slope is negative so del P del Q term is negative. So marginal revenue has 2 parts to it. One is the positive part, other is the negative part and the net is going to determine what is the marginal revenue. So and since this is negative so since this is negative so P is always greater than marginal revenue. So let me draw it.

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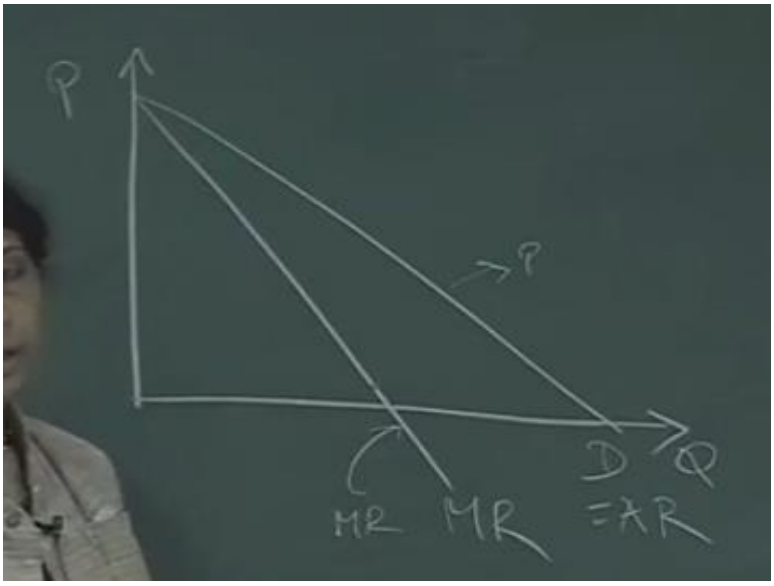

So what we have basically is P and this is the demand line which is also the average revenue line and we have the marginal revenue line here which is always less than the P line. So this demand line is the price line and this is the marginal revenue line and marginal revenue is always less than P except the first unit where P is equal to marginal revenue.

So coming back to the slides, to sell a larger unit monopolist moves down demand curve and reduces price. So marginal revenue is less than price. So marginal revenue can even be negative as we move down marginal revenue it is possible to have marginal revenue less than less than zero but in this entire discussion the assumption is that the monopolist can charge one price to all its customers. It does not discriminate.

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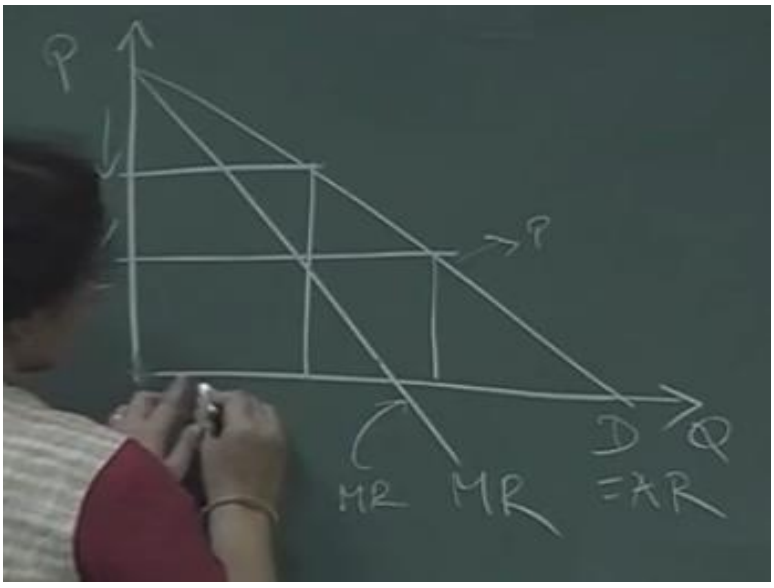

That is we are always assuming that when he reduces his price so when he reduces his price when his price goes down from P 1 to P 2 so he has to reduce the price for all the previous units. It is not that he gets to charge different price to different customers. So this is one assumption that we are making now and this we are going to relax when we discuss about price discrimination but and then it will make more sense why this assumption was important to understand about monopolist when we are discussing all this.

So what is this, so having discussed, so now that we have a understanding about the marginal revenue curve, about the average revenue, about the demand line for monopolist and the choice that he has to make and we have an understanding about the output effect and the price effect so what does the monopolist do. How does he determine what quantity to produce and what price to charge.

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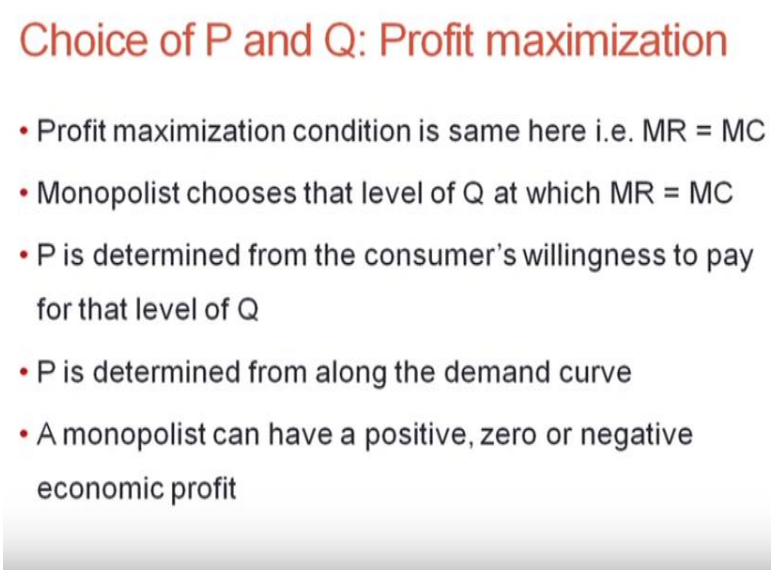

So the profit maximizing condition maximization condition stays the same. The profit maximization condition is the same here as we had in case of perfect competition and that is marginal revenue equals marginal cost. So the monopolist chooses that level of output at which marginal revenue equals marginal cost. So price is determined from the consumer's willingness to pay for that level of output.

And price is determined from along the demand curve. So a monopolist can have a positive, zero or negative economic profit. So let me explain all these.

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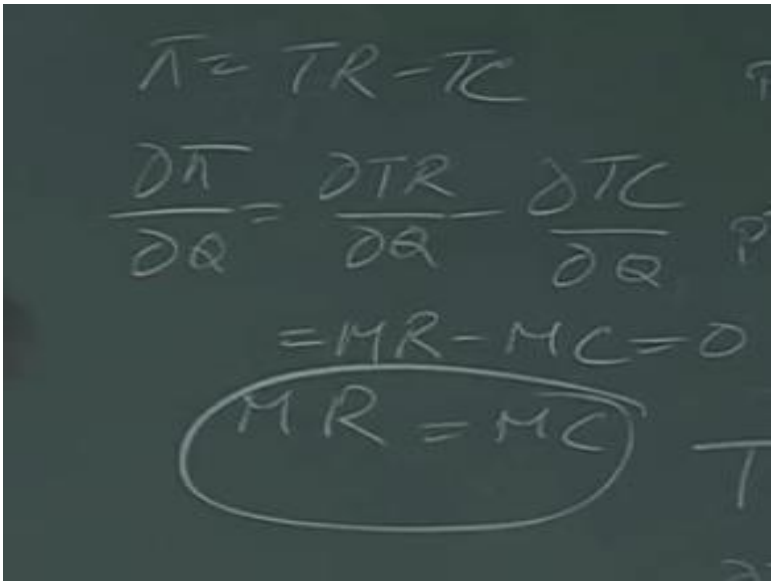

So when we say profit maximization condition is the same here as in case of (monopoly) perfect competition that is because the profit maximization condition that P is equal to TR - TC. This is a quick recap and del pi del Q is equal to del TR del Q - del TC del Q is equal to MR - MC zero as per first order condition and which MR is equal to MC. So MR is equal to MC is always are profit maximization condition no matter what market structure we are discussing. So it is the same. So when we know that it is the MR is equal to MC is our profit maximization condition so let us see what the equilibrium looks like in case of a monopolist.

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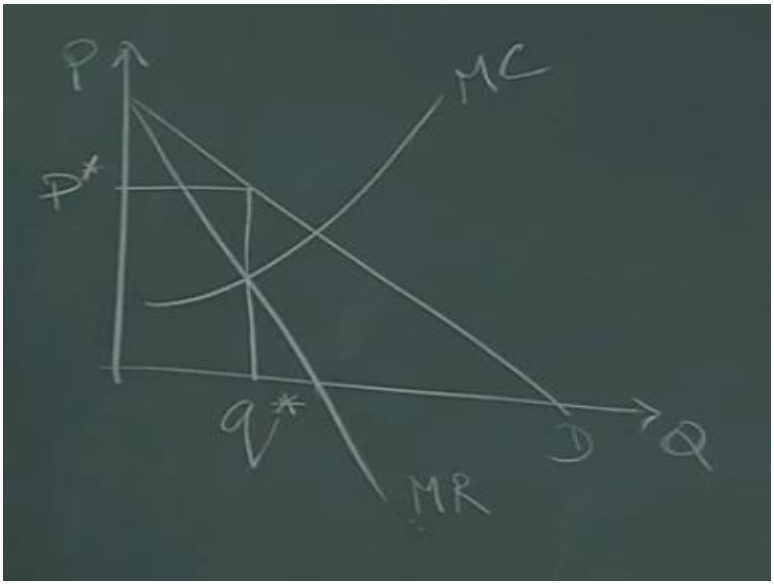

So this is the demand line for the monopolist and this is the marginal revenue and once we have the marginal revenue in place we have we just impose the very familiar marginal cost curve. This is our marginal cost curve. Intersection of marginal revenue marginal cost gives us the profit maximizing level of output. So the MR is equal to MC. This is the, the intersection of MR and MC is where the monopolist is going to choose his output level.

So what price is it going to choose now? Does it choose the price along the MR curve? No. He does not why? Because he is facing the demand curve in the market. He knows if this is the amount that he is willing to sell in the market or if he sells this amount in the market he is going to charge the maximum price that the buyers are willing to pay for this q star and where is he is going to find this price from?

He finds this price on the demand curve. He finds this price on the market demand curve. So basically at this output level he finds what price the consumers are willing to pay and he charges that price P star. So this is his price that he charges in the market. So q star is his MR MC intersection gives him gives us the monopoly output and once we have the monopoly output that output what price the buyers are willing to pay we find from the demand line and that is the price that the monopolist is going to charge.

So what from this we understand that although the monopolist is a single seller in the market yet he has to respect the demand curve. He cannot just charge any price in the market. He respects the demand curve and he charges a price that the buyers are willing to pay for that amount in the market and that he is doing along the demand curve. So now so this is the price quantity combination that the monopolist can charge in the market but is it always going to give him profit? No. It is it does not give us any guarantee that the monopolist is always going to get a profit because profit will depend on what is the average cost of producing this output for the monopolist.

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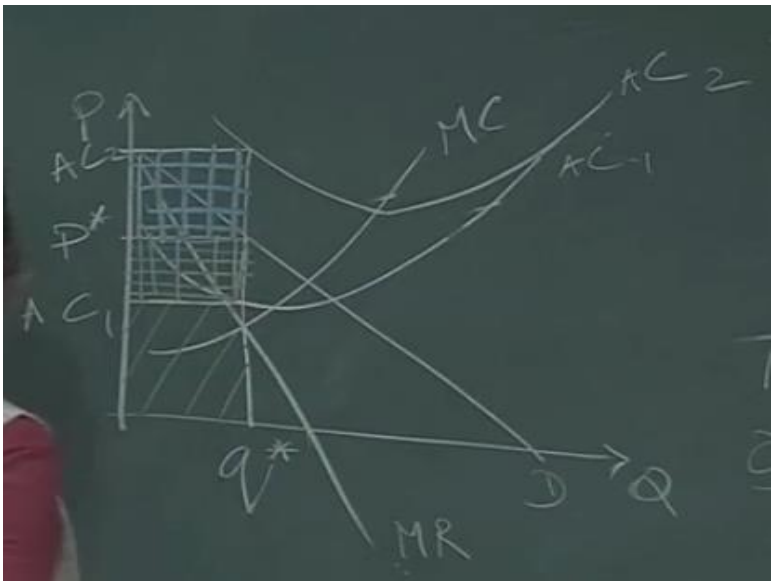

So if the average cost curve looks something like this, if the average cost curve looks something like this then at this level of output q star this is the average cost for the monopolist and he is his total revenue is Pq and this is his total cost. So this is his the horizontal line the box with the horizontal line this is his or square this is his profit.

But if the average cost is say somewhere here sorry it will it cannot look like this. If his average cost looks something like this then his cost of producing q star is very high at AC 2. So he is incurring a loss. He is incurring a loss equal to this blue rectangle. So he is incurring a loss in this case.

So basically whether the monopolist is going to get a profit or not will depend on his average cost of producing the output and we can see from here that it is possible for the monopolist to get a profit and it is also possible for the monopolist to get a loss in the market. So that ends our discussion on profit maximization in the case of monopolist, how does he decide what price to charge and what output to how much amount of output to produce.

In the following sections we are going to look at other issues related to monopolist and we are going to discuss those and we are also going to see what happens when the demand curve what is the, we discussed about elasticity earlier; the elasticity of the demand curve that has some implications on the monopolist's decision. We are going to discuss about price discrimination. We are going to see what happens in case of monopolist, is it a efficient market output or not and eventually we are going to talk about the role of government in case of monopolist. Thank you.