Lecture - 54
Monopoly - II

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Then, we will talk about the types of monopoly. The first one is natural monopoly. It is firm when the size of market is. So, small that it can accommodate only one player means the capacity of the market or the size of the market is. So, small that it can only accommodate one player. Then we have local and regional monopoly, a monopoly that exist in the limited geographic area like whether it is through regulation. Like if you take under the this WTO rules or similarly may be you can take another example like that local grocery store because that serve as a local monopoly because there is no other shops available in that particular region.

Similarly, this regional monopoly is generally if you look at this stripes agreement or the WTO agreement the that leads to the regional monopoly because there is a restriction for the other firms to enter into the market.

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Then we have economic monopoly and economic monopoly is created whenever the competition is eliminated due to economic efficiency of other players or due to superior efficiency of a particular player. So, it is created whenever competition is eliminated due to economic efficiency of the other players or due to superior efficiency of the particular player.

So, may be the efficiency is that one firm is doing really well that leads to the economic efficiency and that stops the other firms to enter into the market. Then we have a kind of monopoly we cannot call it exactly it is a monopoly. It is act of monopoly that is a monopolization where the attempt by the firm to dominate the market or become the monopoly and generally we take the typical example of Microsoft where they are trying to get into the antivirus market and by bundling their product. And that is the classic example we always take that this is the act of monopolization by the Microsoft to become a monopoly leader in antivirus market. Also, because they were trying to do it through the bundling activity; and if you remember there is also a antitrust case against the Microsoft for this monopolization act.

So, it is not a kind of monopoly rather a act of rather a act or rather an attempt by the firms to become a monopoly leader. Then we have a legal or regulated monopoly. It is created when the government restrict the entry of other players in particular market in order to keep the total control in hand. Like the typical example of India and railway and may be the different state electricity board.

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Managerial Economics

Types of Monopolies

- **Legal/Regulated monopoly** : it is created when the government restricts entry of other players in particular market in order to keep total control in hand.
- a monopoly firm whose behavior is overseen by a government entity. – Public utility sector in India

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This is the regulated monopoly because this generally the government keeps all the control. The government takes a call with respect to price and the output decision and that leads to the generally that leads to the market or that leads to the entire market form into the monopoly market.

And generally this is a kind of monopoly where the behavior is overseen by the government entity and typically the public utility sector that is generally known as the generally comes under this form of the monopoly like that example of state electricity board. Orit's a case of we Indian railway where the behavior is overseen by the government or there is some say of the government when it comes to the price and output decision. And that leads to the market as the monopoly firm of market structure.

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Managerial Economics

A Monopoly's Demand and Revenue

- The demand curve is downward sloping.
- The demand curve of monopolist is highly price inelastic.
- When a monopoly drops the price to sell one more unit, the revenue received from previously sold units also decreases.

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Then we will talk about the demand and monopoly demand and revenue of a monopoly market demand curve is downward slopping. It is a regular demand curve downward slopping price and quantity demanded. There inversely related and if the monopolist want to sell they have to reduce the price. So, the demand curve of monopolist is highly price inelastic because of this is the single product available in the market. And there is no close substitute that leads to the inelasticity of the monopolist. And that is why the demand curve is highly price inelastic.

When a monopoly drops the price to sell one more unit the revenue is received from the previously sold unit also decreases. Because since there is a single product and there is no close substitute sometime if the monopoly firms wants to sell more. They have to at least reduce the price and in this case the revenue received from previously sold unit also decrease decreases because the price is decreasing even if the quantity is increasing.

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So, when a monopoly increases the amount itself it has two effect on total revenue. So, what is our total revenue? Total revenue is price and quantity. So, output effect more output is sold and Q is higher because there is a decrease in the price that leads to a output effect because Q is higher price effect price decreases. So, price is generally lower. So, whenever the monopoly increase amount itself it has to reduce the price then only the sale will be more. And that is why it leads to two kind of effect; one is output effect and second one is the price effect.

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So, here the average revenue curve is denotes the demand curve for the firm and also determine the slope of the marginal revenue curve. So, average revenue curve is also the demand curve. This is the same in case of a perfect competitive market structure also because the average revenue is also equal to the demand curve. But here the difference is that here the marginal revenue curve is separate. But in case of competitive market structure the marginal revenue curve is also equal to the average revenue curve.

And the average revenue curve also determines the slope of the marginal revenue curve since the demand curve is highly inelastic average revenue curve would be downward slopping and the marginal curve would lie below the average revenue curve. So, if the demand curve is highly inelastic average revenue curve will be downward slopping and marginal curve would lie below the average revenue curve and the monopolist marginal revenue is always less than the price of its good.

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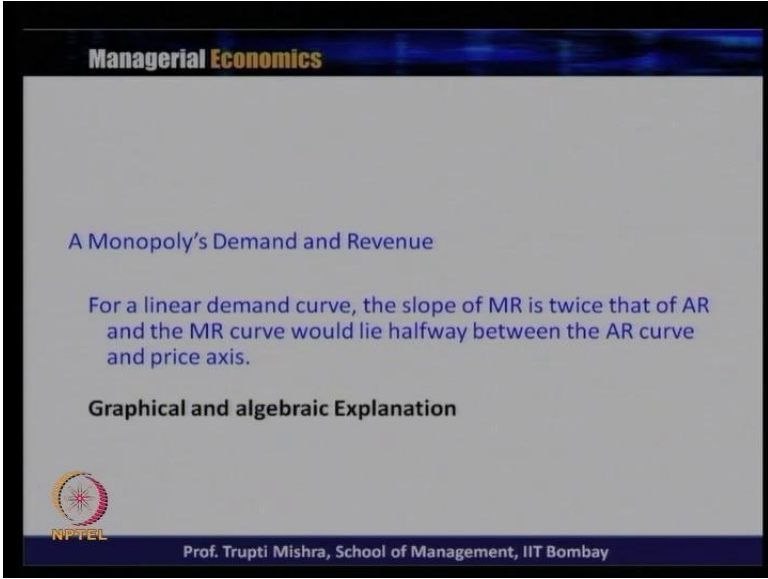And why it is generally less than the price of its good? Because monopoly has to lower the price of all units of its product if it wants to sell the additional unit and the additional to the addition to the total revenue resulting from selling additional unit would be less than the price of the firm. It would receive for this unit. It means the marginal revenue has to be less than the price. So, MR is less than price and MR curve would lie below the average revenue curve.

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Now, we will see for a linear demand curve the slope of the marginal revenue curve is twice that of average revenue curve and marginal revenue curve would lie half way between the average revenue curve and the price axis. So, for a linear demand curve the slope of the MR is twice that is slope of the AR it will lie half way between the price curve price axis and the average revenue curve.

So, let us see the how generally we graphically look at the slope of the average revenue curve and the slope of the marginal revenue curve. And we will check whether the slope of the marginal revenue curve lies below average revenue curve and algebraically also we will see what is the slope. What is the slope? Generally, for the average revenue curve and whether the slope of marginal revenue curve which twice of the slope of the average revenue curve.

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So, if you take a demand curve that is $P=a-bQ$; then what will be the revenue? Revenue is $R=PQ$. And if it is then it is $R=(a-bQ)Q$ which leads to $R=aQ-bQ^2$ and this is the total revenue slope of average revenue will be b. Because this is TR by Q $\frac{TR}{Q}$ and slope of marginal revenue will be we need to find out the slope of marginal revenue. And what is marginal revenue? Marginal revenue is $MR=\frac{dR}{dQ}$. So, that comes to $MR=\frac{d(aQ-bQ^2)}{dQ}$ and that get it then this is. $MR=a-2bQ$ And what is the slope of marginal revenue curve? The slope of marginal revenue curve is minus 2 b.

So, slope of average revenue curve is b and slope of marginal revenue curve is 2 b. So, we can conclude that the slope of marginal revenue is twice that of slope of average revenue curve because the slope of AR is b and slope of M R is 2 b.
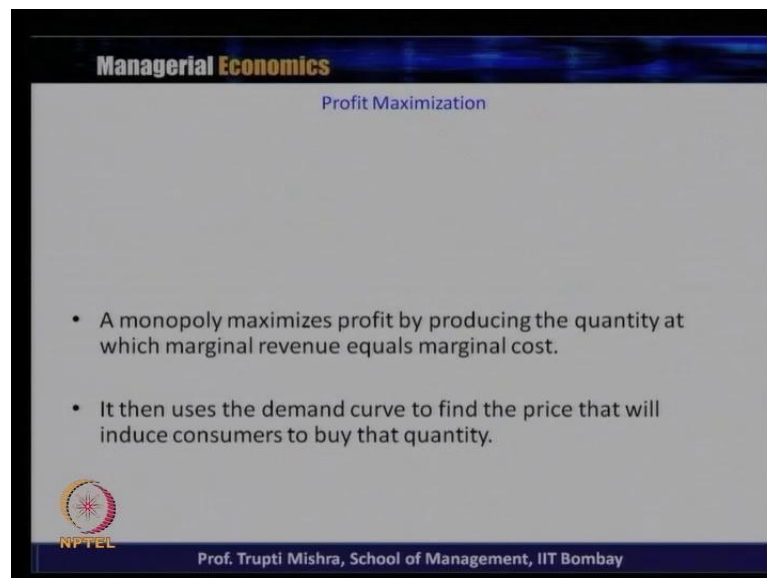
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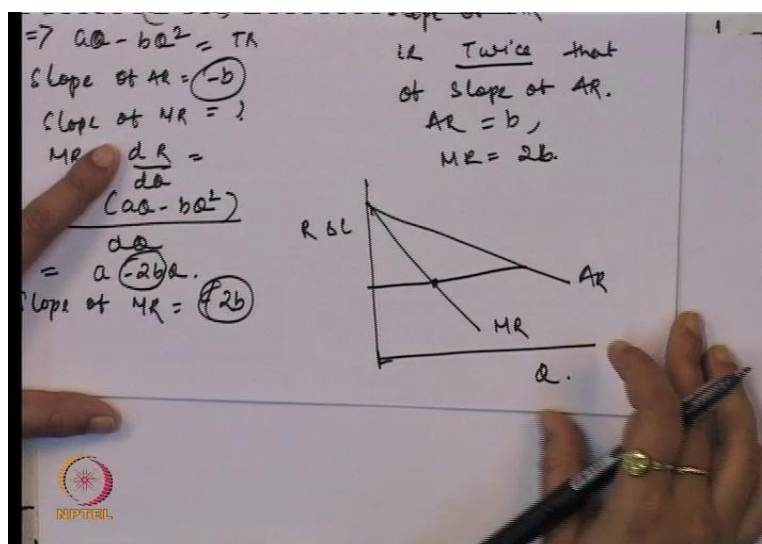
Then graphically how we generally represent this? Graphically, we represent this as this is our average revenue curve and this is the marginal revenue curve. Here, we take revenue and cost and here we take the quantity. And if you look at the marginal revenue curve, you just look at it lie in the half way between the average revenue curve and the price axis.

So, monopoly demand curve if you look at monopoly demand curve is the average revenue curve. And the slope of the average revenue curve in a typically demand function if it is $AR = a - bQ$; then if it is get b and slope of marginal revenue curve is $-2bQ$. So, that leads to the slope of marginal revenue curve is the twice of the slope of the average revenue curve and for a linear demand curve always the slope the MR lies below the average revenue curve, because the slope is more than the slope of the average revenue curve.

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Then, we will come to the profit maximization of the monopoly firm. So, the profit maximizing rule is again same marginal cost has to be equal to marginal revenue for the first order condition and the slope of the mc should be greater than the slope of the MR for the second order condition. So, monopoly maximizes the profit by producing the quantity at which the marginal revenue equal to marginal cost. And then it uses the demand curve or the typical average revenue curve to find what price induce the consumer to buy that quantity.

So, the first one they find out the output level by MR and mc that the profit maximizing rule. And then by using the demand they find out the price at that price what the consumer which is ready to buy.

So, what is that the steps for the profit maximization? We need to set marginal revenue is equal to marginal cost to find the Q that maximizes the profit. Then we use the market demand curve to find out P that the Q brings. And then, we find average total cost and average variable cost to determine profit losses or shut down.

So, the first step is to equalize marginal revenue and marginal cost find out the Q that maximize the profit. Then we use the market demand curve to find the price that the quantity brings. And finally, we will find out the cost associated with that level of producing Q because that will tell us whether the firm at that level of quantity whether the firm is incurring loss making profit or making super normal profit.

So, here the profit is equal to the total revenue minus total cost total revenue is that is PQ and total cost is a fixed cost plus the variable cost. So, profit is total revenue minus total cost. So, if you simplify this then it becomes $Profit = (P - ATC)Q$. And this is also called as the profit margin and the monopolist will receive economic profit as long as price is greater than the average total cost. So, till the time price is greater than average total cost monopolist will receive economic profit. If the price is equal to the average cost, the average total cost that is normal profit and if the price is below the average total cost then it becomes the loss.

Then we will case the take the case of in case of short run we will take the case of super normal profit in which case generally the firm gets super normal profit. Then we will take the case of loss like in which case the firm gets loss and in which case the firm gets the normal profit.

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So, to start with we will do it for the super normal profit. So, we will find out our here we will take quantity here.

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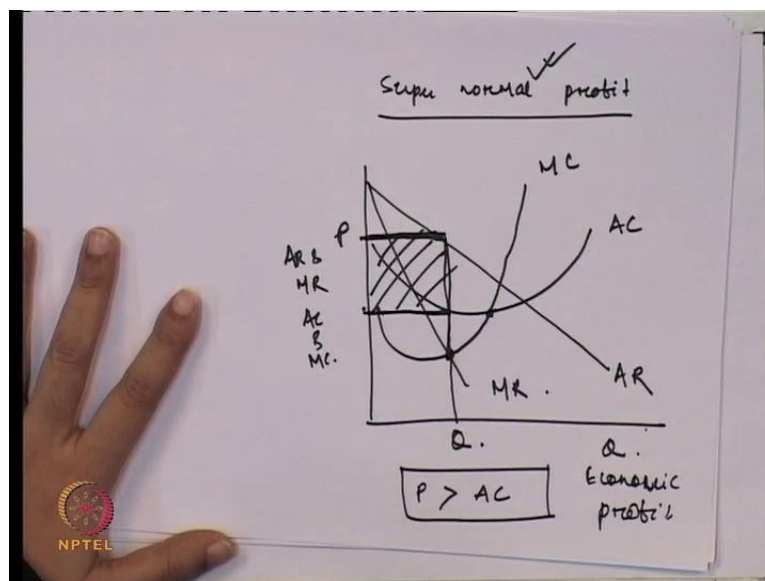
We will take average revenue marginal revenue average cost and marginal cost. So, this is our average revenue, this is our marginal revenue. Then this is our average cost, marginal cost intersect the average cost at its minimum.
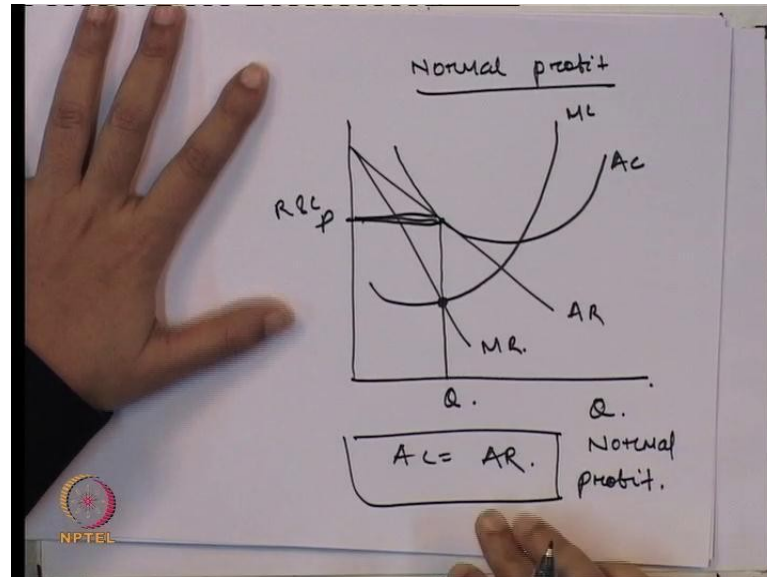
Now, what is the, what is the steps for the profit maximization? First, we need to find the equality of marginal cost and marginal revenue. So, this is the point where the first order condition gets fulfilled. And corresponding to this we will identify the quantity this is the profit maximizing level of output. Next what we should do using the demand curve we will find out the price. So, corresponding to this we will find the price axis and this is the price, now this is the profit maximizing quantity, this is the profit maximizing price. This we have got through the equalization of marginal cost and marginal revenue.

Now, next we need to find out at this price, at this quantity what the, what is the situation for the firm? Whether the firm is getting super normal profit, whether the firm is getting the normal profit or whether the firm is getting loss. How to find out that? That is through the average revenue or so called price and the average cost. So, corresponding to this what is the average cost corresponding to this? This is the average cost and this is the price. So, P is greater than average cost.

So, if you remember till the time P is greater than average cost the firm will get economic profit or so called super normal profit. And what is the amount of the super normal profit? The difference between the average cost and the average revenue curve and this is the amount

of profit super normal profit what the firm is getting. So, if the price is greater than average total cost. The amount between the average total cost and the average revenue curve, that gives us the super normal profit. This is above of the cost of production.

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Now, next we will find out what is the second situation that is for the normal profit. We will follow the same process or the same steps to find out the normal profit. So, here we have revenue and cost. Here we have quantity, we will draw a average revenue curve, we will draw the marginal revenue curve. Then we will draw out average cost curve and we will draw the marginal cost curve, we have average revenue, we have marginal revenue, we have average cost, we have marginal cost. Marginal revenue, marginal cost is the to find out the profit maximizing level of output corresponding to that we get the level of output corresponding to that in the demand curve we get the price.

Now, what is the next task if this is the profit maximizing price? This is the profit maximizing output. We need to find out that what is the profit? What is the profit or what is the loss. So, in this case if we look at corresponding to this point, the average cost is just equal to the average revenue. If average cost is equal to average revenue the firm is incurring no loss. The firm is not incurring the super normal profit. Now, this is the case of a normal profit where corresponding to the profit maximizing level of output the average cost is equal to the average revenue curve.

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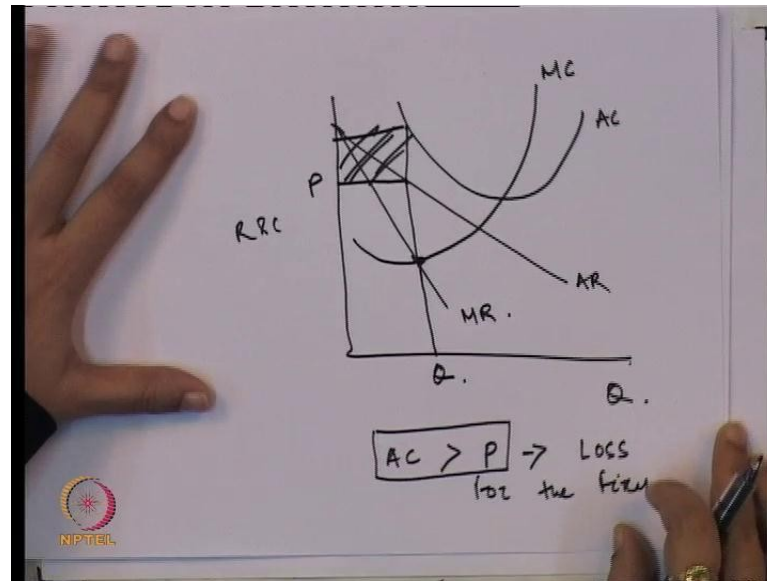
Then we will analyze the case of loss where particularly the firm incurs loss when it is a profit maximizing condition. So, we have average revenue quantity revenue and cost. We have marginal revenue, we have average cost and we have marginal cost. We will find out the marginal revenue marginal cost condition. We will find out the Q, we will find out the P. So, this is P, this is Q corresponding to this. If we will find this the amount of the cost; so in this case the average cost is greater than price and that leads to the loss for the loss for the firm H; this much area, because this keeps the difference between the average cost and P. So, in this case at this level of output the average cost is higher than the price and that is why the firm is incurring loss. The common question comes here whether since it is a case of the monopolist whether the firm should incur loss or not because it is a monopolist they have a independent independent capacity to take a decision on the price and price and output there is only single firm single producer at least there is no close substitute. So, monopoly is a market firm where there is no close substitute.

Now, still when the firm is incurring loss in the short run what may be the possible reasons? There is possibility that the firm may incurs loss, in the also in the short run. And what are the possibility or what is the reason that the firm is incurring loss in the short run?

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First, may be it is possible that in the early year the monopolist may not very efficient to attain the low average cost of production, may be the cost efficiency or may be to attain the low average cost of production. It is not possible at the early year of the monopoly.

Then the size of the market in the early years may be small hence to sell the entire output firm has to incur the losses. So, the size of the market in the early year may be small not very large and to sell entire output, may be the firm has to lower the price which leads to incur or may be evidence of loss in the short run.

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Then the monopoly firm deliberately charge a low price to keep the competitor out of this market. Why they charge a low price? If you remember whenever there is a super normal profit that attracts the firm other firms to enter into the industry.

And if they are charging a high price that leads to super normal profit and that will attract the new firms enter into the industry and in that case may be the competition will be there and it may not be a monopoly market again. And that is the reason they take a strategy to maintain a lower price. Because if we are maintaining a lower price that is not profitable for the other firms to enter into the market or there will be no incentive for other firms to enter into the market. And that serve as a entry barrier, but in other side when they are charging a low price generally that that leads to the loss for the firm because they are they are charging a low price. And that leads to a situation where price is less than the average total cost.

Then in order to curve the creation of monopoly sometimes the government may impose a tax on the monopoly product which in turn increases the cost of production. So, there is a tax. So, whenever there is imposition of tax that increase the cost of production and in that case whatever the price they are charging that becomes less than the average total cost and that leads to the that leads to the may be the possible cause or that leads to the sum up sum up the loss in the monopoly market.

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Then we will come to the price and output determination in the long run. So, here you look at the long run again. It is different from the short run in term of the factors used incase of the expanding the scale of operation or may be the it has a there is no fixed cost or there is no fixed in input. All the inputs are variables. That is why all the cost are variable. So, in the

long run monopoly firm would either earn normal profit or super normal profit, but would in not incur loss in the long run because if they are, if you if you have if you remember the in case of competitive market when the firm incur loss in the short turn. Still, they continue with a hope that the long run they are going to incur loss in at least they can they are going to make the normal profit. But in case of monopoly generally in the long run, they are not going to incur loss at all; either they will get a normal profit or super normal profit.

But as a strategy they prefer to take a normal profit because when it is they are earning super normal profit that work as a incentive for the incentive for the other players to enter into the market. And that is the reason if we look at all the firms they get normal profit not the super normal profit. And they would rather try to reduce the cost of production increasing the control of raw materials. And that will give some amount of profit to the firm above the normal profit because if they are reducing the cost of production still charging that much price the gap between the price and total cost is more and that brings more profit to them.

And how generally they reduce the cost of production when by increasing the control on the raw materials? Because since they are the sole producer of sole seller if the raw material the suppler is not selling the raw materials to them may be there is no there is no market for that particular raw material. And in that way the exercise control on the supplier of the raw material they get it in the reduced cost and that again leads to the reduce cost of production for the other firms.

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So, what happens when they are getting the super normal profit? Super normal profit leads to high price, attract competition high price will allow to survive the new entrant and the it leads to again competition. So, whenever there is a super normal profit; if they are getting super normal profit it's always the because of high price which attracts the competition and high price will allow to survive the new entrant and that will lead to competition.

So, to retain the monopoly power generally the firm they charge a low price where they get only the normal profit and the low price also serve as a entry barrier for the new firm. Then we will just take a numerical to understand that how in the long run the price and output is decided and also the profit.

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So, here we take the total cost that is $TC=50+40Q$. We will take the demand curve that is $P=100-2Q$, we need to maximize the profit and for that we will find out the

$$\frac{d\pi}{dQ}=\frac{dR(Q)}{dQ}-\frac{dC(Q)}{dQ}$$

Now, marginal revenue is equal to marginal cost. So, if you know from here because this is marginal revenue this is marginal cost. If this is equal to 0 then marginal revenue is equal to marginal cost. We will find out now the marginal revenue and we will find out now the marginal cost. What is total revenue? Total revenue is $TR=(100-2Q)Q$ So, that comes to

$TR=100Q-2Q^2$ and marginal revenue is $MR=\dfrac{d(TR)}{dQ}=100-4Q$. So, this becomes 100 minus 4 Q. This is the value of the marginal revenue

Then we will find the marginal cost; and how we can find out the marginal cost? That is again through the taking the derivative from the total cost function with respect to the with respect to the Q. So, we have total cost function that is $TC = 50 + 40Q$ and marginal cost is

$MC = \dfrac{d(TC)}{dQ} = 40$ So, that becomes 40. So, we have now we will find out find out the

quantity. So, marginal revenue is $MR = 100 - 4Q = MC = 40$ and if you simplify this then this is 4 Q is equal to 60 and Q is equal to 15. Now, from here we can find out the value of P. How we will find out the value of P, $P = 100 - 2Q$. So, that comes to 100 minus 30. That is 100 minus 30. That is seventy. So, P is equal to 70, Q is equal to 15. Now, we will see because this is the first order condition will see whether the second order second order condition gets fulfilled or not.

So, second order condition is $\dfrac{d^2\pi}{dQ^2} < 0$. So, in this case if you look at what is the, what is the second order derivative of this, if we look at this is minus four; if you solve this is we get minus four which is less than 0. So, second order condition also get fulfilled and with this value of P is 70 is Q is 15. We get the value of profit, which is equal to 400. So, this is how generally we solve the numerical when it comes to whether short run or long run. We equalize that with a, we check whether both the conditions get fulfilled or not and from the first order condition we get the value of Q and P. We put the value in the Q revenue function and cost function in order to get the profit. So, we will stop here today. In the next section, we will discuss about the supply curve of the monopoly firm. How the measurement of the monopoly power is done. Generally how the multi plant firms they function? Or how the

price output determination is done in the multi plant firm? And we will do a comparative assessment between the monopoly firm and the perfect competitive firm.