IIT Madras

ONLINE DEGREE

Mathematics for Data Science 1
Week 07- Tutorial 06

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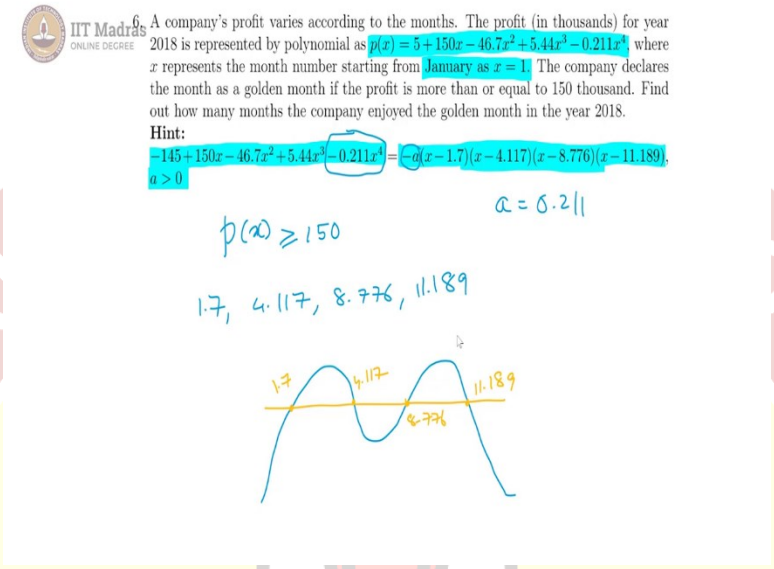

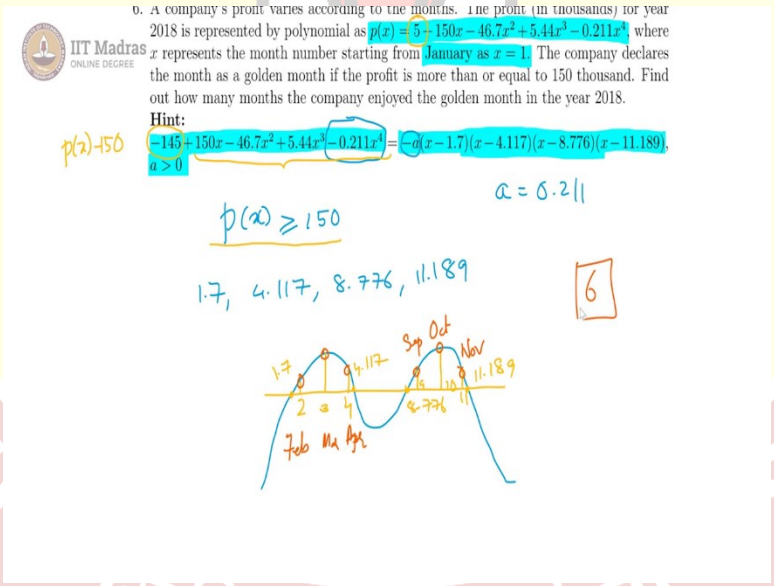

So here we have a company's profit varies according to the months. So they are going to have a profit versus time along in the profit in thousands for year 2018 is represented by this polynomial $p(x)$ is equal to this quartic polynomial fourth power polynomial where x represents the month number starting from January as $x = 1$. So January is x=1. The company declares the month as a golden month if the profit is $\geq$150 thousand.

So golden month is when $p(x) \geq 150$. Find out how many months the company enjoyed the golden month in the year 2018. So how many times does this happen? Alright, and there is a hint also given to us where this cortex is apparently equal to. So they have basically given us the roots of the polynomial and a does not matter, $a > 0$.

And so we can also tell what a is a has to be minus 0.211 because that is the coefficient of x^4 here and minus a will be the coefficient of x^4 and the RHS therefore a has to be equal to 0.211, $-a = -0.211$. Therefore, $a = 0.211$. Anyway so now given that we already have the roots, the roots are essentially 1.7, 4.117, 8.776, and 11.189. So these are the roots and the coefficient of the highest power of x is negative.

It also even so our curve is going to be something like this. Where the x axis cutting it here and that would mean this point is 1.7, this is 4.117, this is 8.776, and this is 11.189. So all of this is given to us but what we are supposed to find is to related to $p(x) \geq 150$. So given that $p(x)$ is all this stuff plus 5 and here we have the same terms of $x - 145$, we can see that this particular polynomial given to us is simply $p(x) - 150$.

So whenever this polynomial that we have drawn here is greater than it. We have a golden month so that would be month 2, 3, and even 4, then 5, 6, 7, and 8 do not come in and here we would have month 9, and 10, and also 11. So as you can see this, this, this 3 and again 3 here. So it is overall 6 months during which we can also tell which ones is Feb, March, and April, and here this is September, October, and November.

So 6 months are the golden months in that year for this company.