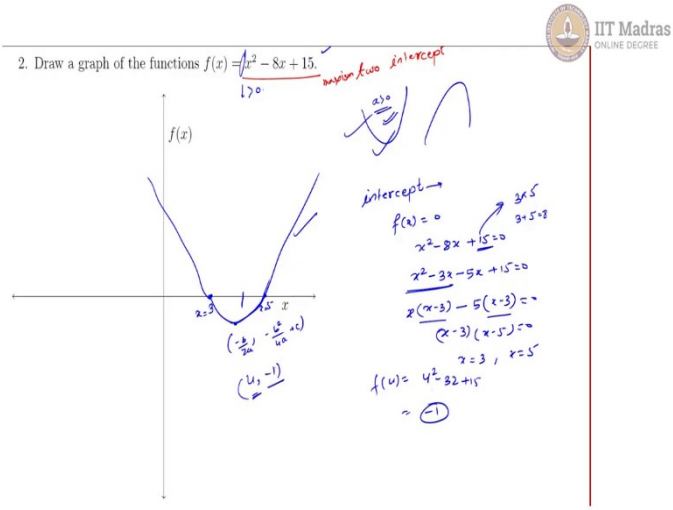

# IIT Madras

## ONLINE DEGREE

**Mathematics for Data Science 1**
**Professor. Neelesh S Upadhye**
**Department of Mathematics**
**Indian Institute of Technology, Madras**
**Week 8 - Tutorial 2**

(Refer Slide Time: 0:14)




The second question is about drawing the graph of a quadratic function. So this is and quadratic function again as we did in question 1, it will give two, maximum two intercept and we know that the curve will look like this or this or it will happen when the $x^2$ the coefficient of $x^2 > 0$. So here, it is 1 so greater than 0, so this curve will be representing this function.

Now to find the intercept $f(x) = 0$, so $x^2 - 8x + 15 = 0$ if I do the prime factorization I will get 3× 5 and after summing of 3+ 5 I will get 8 so I will use a factorisation method to solve this. It will be $x^2 - 3x - 5x + 15 = 0$.

Now this will give me $x - 3$ when I take $x$ common - 5 common $x$ -3 =0 then $x$- 3 common it will give $x$-5=0 which means $x$=3 and $x$=5 are the intercepts or roots of this quadratic equation. If they are roots, it means the curve will cross $x$ axis at these points, so if this is $x$ =3 and this is $x$=5, here the curve will cross.

Now as we know that this is open upward parabola we will get one turning point if we are getting two intercepts. So, that turning point will be somewhere here, which means we have only one option that is this, so this is an rough diagram only, so this will be the two intercept and this will look like the parabola will look like this parabola. What will be this point? We

can find this is the vertex and vertex we can find that using $\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ formula. So, it will be - 8 / 2 and if I take - then it will be 4 which is between 3 and 5 it should be actually due to symmetricity.

Now what will be value at 4? $f(4) = 4^2 - 32 + 15$ which means $16 - 32 - 16 - 1$ this is correct actually, why this is a this should be negative we got negative, this should be between 3 and 5 we got 4.