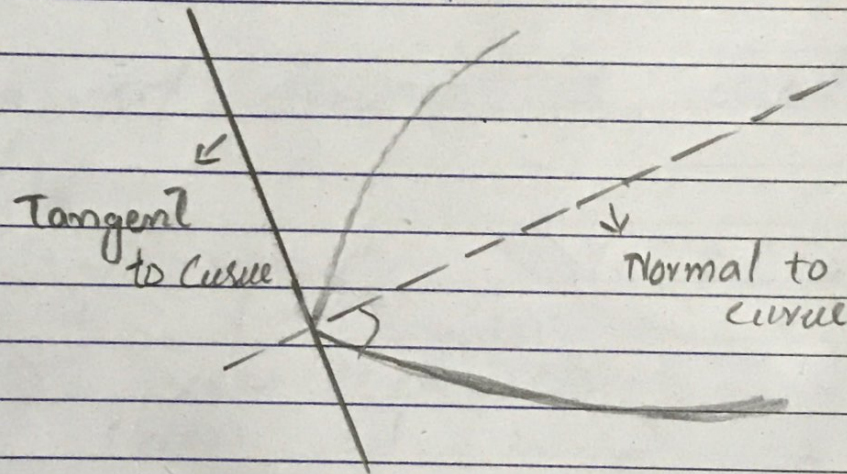


## Application of derivatives:

⇒ A tangent to a curve is a line that touches the curve at one point and has the same slope as the curve at that point. A normal to a curve is a line perpendicular to a tangent of the curve at that point.



## Application OF Derivatives in Engineering

- ⇒ Rate of change of quantity.
- ⇒ Increasing and decreasing functions.
- ⇒ Tangent and normal to a curve.
- ⇒ Minimum and maximum values.
- ⇒ Newton methods.
- ⇒ Linear approximations.

## 1) Rate of change of quantity:

General and most important application of derivatives

i.e. check the rate of change of the volume with respect to its decreasing sides.

Form of derivatives used  
 $dy/dx$

- $Dy$  represent rate of change of volume.
- $Dx$  represent change of sides of cube.

## 2) Increasing and decreasing functions.

To find that gives function is increasing or decreasing or constant, say in graph we used derivatives.

if it is a function which is continuous in  $[P, Q]$  and

differentiable in the open interval then  $[P, Q]$  then.

### → Newton method:-

The process involve making a guess at the true solution and then applying a formula to get a better guess and until we are at acceptable approximation for the solution.

if we find  $x$  so that  $f(x) = 0$

Then we guess some initials value  $x_0$  which is close to desired solution.

$$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$$

### → Related Rates:-

IF two variable both with respect to time and have a relation b/w then we can express the rates of change of one interm of one another.

That's is we all by finding  $\frac{dy}{dt}$  for some function  $f(t)$

# Application of integration in Engineering ::

There are many application of integration in engineering. Some of these are

## 1) Shear force & Bending Moment:

\* Shear force and bending moment are one of important parameters for structural design. These parameters effects a structure effects.

\* Some force will develop inside the rod which will try break the rod in direction of force that force is called shear force & product of that force which distance from either end is bending moment.

## 2) Length of Curve :

Corrugated iron is used extensively through out the material into a regular since were slaped is used

→ So integration is used to find out how wide should the flat sheet so to give as corrugated sheet or required width.

→ Moment of inertia by integration.

Moment of inertia is (scalar) property of a section of structural member which is required to measure its resistance to bending and buckling.

⇒ Moment of inertia about X-axis.

$$I_x = \int A y^2 dn$$

⇒ Moment of inertia about Y-axis.

$$I_y = \int A x^2 dn$$