IQRA NATIONAL UNIVERSITY PESHAWAR

ASSIGNMENT NO 01

DEPARTMENT OF CIVIL ENGINEERING

SUBJECT: APPLIED CALCULAS

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SEMESTER: 8TH

SECTION: B

Q N0 01: **ANSWER**

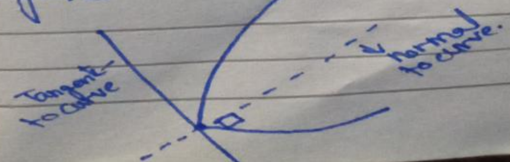
→ ~~Calculats~~

⇒ we use the derivations to determine the maximam and minimum valuse of particular function (e.g) cost, strength, amount of meterial used in building profit loss etc.

⇒ Derivation are met in many engineering and science problems especialy when modeliy the behavior of moving object our disassions begins with some genral application which we can then apply to specific problem.

Application of Derivation.

Tangents And Normal :⇒ A tangent to a curve is line that the curve 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 at the curve



Note: we find the slope of a tangent at any point (x, y) using dy.

Tangent: If we are travelling in a car around a corner and we drive over some thing slipery on the road like oil, water and our car starts to slid it will continue in a direction tangent to the curve.

Normals:⇒ The spoker of a wheel are placed normal to the circular shape of the wheel at each point where the spoke connects with the center.

Newton Method:⇒
The process involues making a guess at the true solution and the applying a formula to get a better guess and so on until we arrive at an acceplatable approx mation for

the solution and then applying a formula to get

If we wish to find x so that $f(x)=a$ then we guess some initial value x_0 which is aloss to desired solution and then wer get a better approximation using Newton Method

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

Retated Rates:

If two variables both vary with respect to time and have a relation between them, we can express the rate of change of one in terms of one another

That is well be finding $\frac{df}{dt}$ for some function $f(t)$

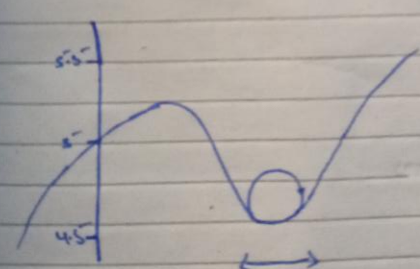
Curvilinear Motion : $v = \frac{ds}{dt}$, $a = \frac{dv}{dt} = \frac{d^2s}{dt^2}$

These formulae are only appropriate for rectilinear motion (velocity and acceleration in a strength line This is inadequate for most real situation so we introduce here the concept of arvilincar motion where an object is moving in a plane along a specilid cured path we generally expan the x and y component of the motion as function of time this form is called parametric form.

Radius of curvature:

$$\text{Radius of curvature} = \frac{\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2}}{\left[\frac{d^2y}{dx^2}\right]}$$

The radius of curvature of the curve at the particular point is defined as the radius of the approximating circle. This radius changes a we move along the curve the formula for the radius of curvature of any point x for the curve $y = f(x)$



load is applied at the centre with application of load the beam will bend.

⇒ Some force will develop insid the rod which will try to bleak the rod in direction of force that force is called shear force and Product of that force with distance from either end is bending moment.

2) Length of curve:- Corrugated Iron sheeting:-

⇒ Corrugated iron is used extensively through out the world as a versatile building meterial. Bending the material in to a regular sine wave pattern gives is greater strength than if a flat sheed is used

⇒ So integration is used to find out how wide should the flat sheed be to give us a corrugated sheed of requited width.

3) Area order a curve by Integration:

In civil engineering when we are dealing with curve or structure having curve then may need to find the area onder the curve which is to be constructed so we use integration for this purpose.

$$\text{Area} \int_a^b f(x)dx$$

4) Moment of Inertia by Integration

Moment of inertia is a geomtrical property of a section of a structural member which is required to measure it, ~~to~~ resistance to bending and buckling.

⇒ I moment of Inertia about x-axis

$$I_x = \int_A y^2 dA$$

Where y is the y cordinate of the diffential element of area dA

⇒ moment of Inertia about y-axis

$I_y \int_A x^2 \, dA$

where x is the x-cordinate of element dA

Centroid of an Area By Intgrations:

In tilt-slab construction we have a cut out) concrete wall (with doors and windows cut out) which we need to raise in to possition we don't want the the wall to crack as we raise it so we need to know the centre of mass of of the wall we can find the Centroid of an area with straigh sides then we will crved sides where will use Integration.

The End