

# Assignment (Group 2)

## Calculus and Analytical Geometry

### Energy and Environment - Batch 15

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1. A function is continuous if you can draw its graph without having to lift your pen from the paper. Why is that? Show your understanding about it.
2. What does it mean for a line to be tangent to a curve  $C$  ( $y = f(x)$ ) at a point  $P = (x, y)$ .
3. Find first order partial derivative of following:

(a)  $f(x, y) = x^4 + 6\sqrt{y} - 10$

(b)  $f(x, y, z) = x^2y - 10y^2z^3 + 43x - 7 \tan(4y)$

4. How do you find the limit of a rational function  $y = f(x)$  as  $x \rightarrow ?$  Give examples. Note that rational functions are the ones which can be written in fractions. i.e. in form of numerator and denominator.
5. For a given integrable function  $f(x)$  and real numbers  $a < b < c$ , prove

$$\int_a^b f(x)dx + \int_b^c f(x)dx = \int_a^c f(x)dx$$

6. Solve the following integral

$$\int_0^\pi \cos^{2n+1}(x)dx$$