Curve tracing and Fitting methods

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Abstract

Curve tracing is important concept to trace curve, in this paper we discuss properties of the curve

1. Introduction

Using Curve tracing we can determine the properties of the curve easily whether the equation given in explicit form y=f(x) or implicit form g(x,y) = c by knowing its graph.

1.1 Symmetry :

1) If the equation of the curve is an even function of x i.e; f(-x) = f(x) then the curve is symmetrical about the Y-axis.

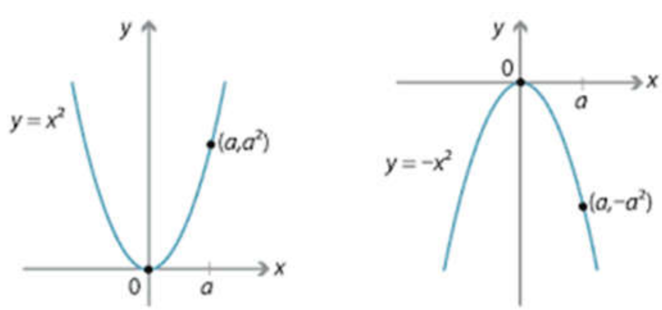

Figure 1

2) If the equation of the curve is an even function of y i.e; f(-y) = f(y) then the curve is symmetrical about the X-axis

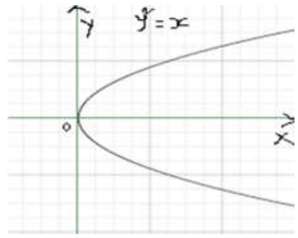

Figure 2

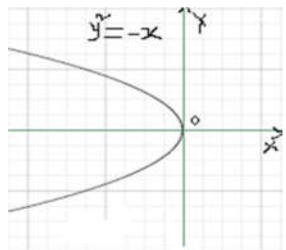

Figure 3

3) If the equation of the curve is an odd function of x, then the curve is symmetric about the origin.

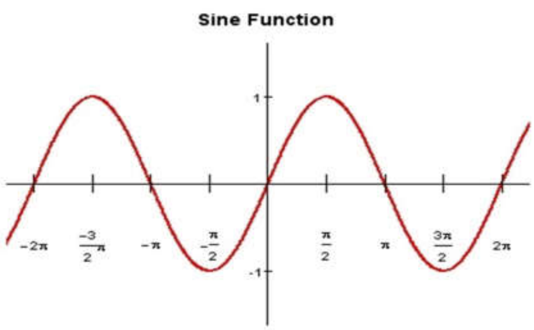

Figure 4

4) If the equation of the curve is unaltered when x and y are interchanged , then the curve is symmetric about the line y = x.

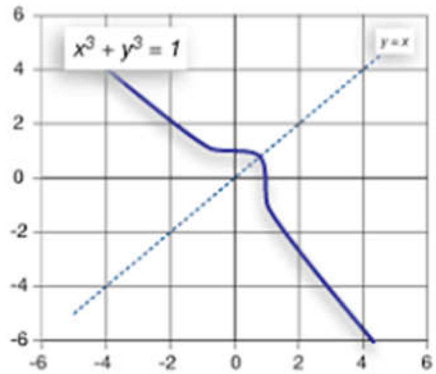

Figure 5

5) The curve is symmetrical about the line y = -x if the equation of the curve remains unaltered when x and y are replaced by –y and –x respectively.

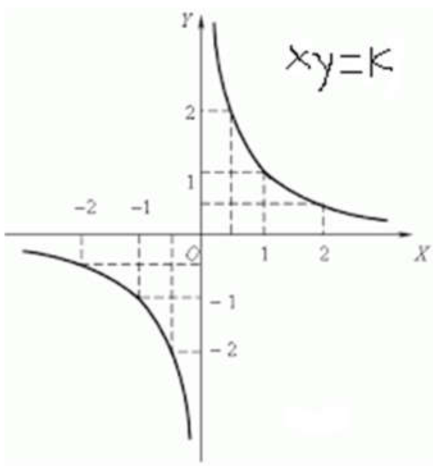

Figure 6

6)The curve is symmetrical in the opposite quadrant if the equation of the curve remains unaltered when x and y are replaced by –x and –y respectively.

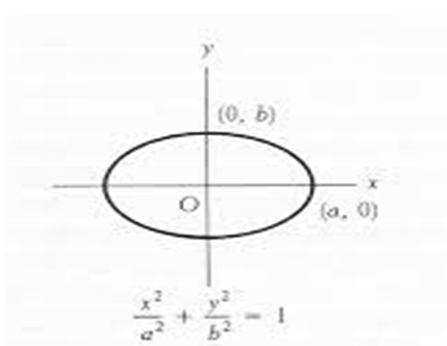

Figure 7

1.2 Region Of Existence :

Find the region for x for which y is not well defined (i.e; y is imaginary),the curve doesn't exist at those points.Similarly Find the region for y for which x is not well defined (i.e; x is imaginary), the curve doesn't exist at those points.

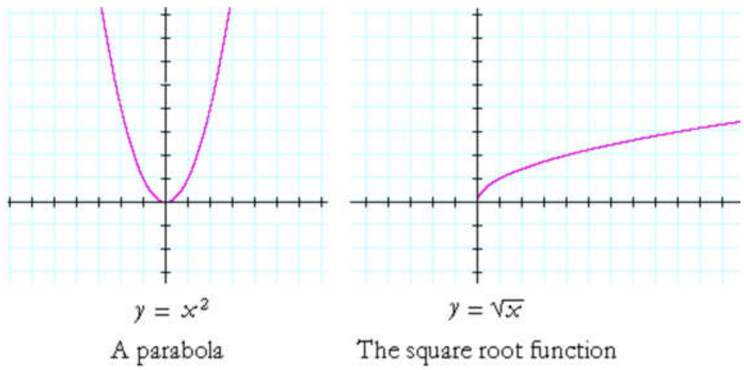

Figure 8

1.3 Point of Intersection with the co-ordinate axes and the line of symmetry

1) Find the points where the given curve meets the x-axis by taking y=0 and solving. Similarly Find the points where the given curve meets the y-axis by taking x=0 and solving.

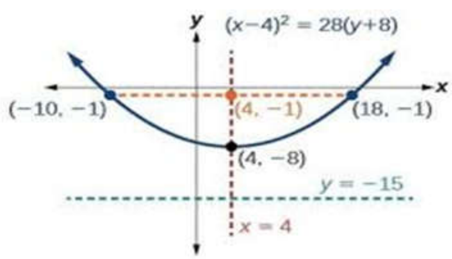

Figure 9

2) If the curve is symmetric about the line y = mx+c,find the points where the curve cuts the line.

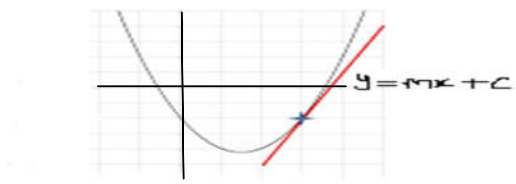

Figure 10

Origin:

If the equation of the curve is satisfied by (0,0) then it passes through origin

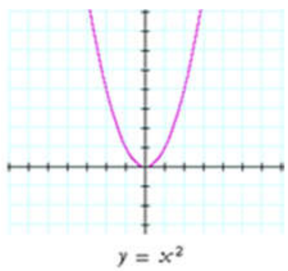

Figure 11

Tangents:

1) Tangent at origin is obtained by equating lowest degree term in the equation of the curve to 0.

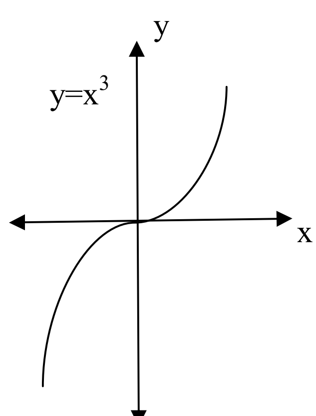

Figure 12

2) Tangent parallel to x-axis is obtained by solving dy/dx = 0,Similarly Tangent parallel to y-axis

obtained by solving dx/dy = 0

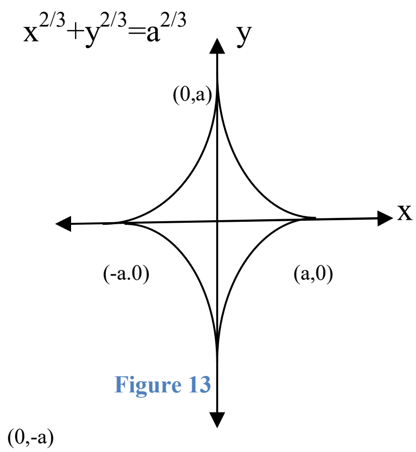

Figure 13

Here x-axis and y-axis are the tangents.

3. ASYMPTOTES:

A straight line is said to be an asymptoteto an infinite branch of a curve if the perpendicular distance from a point on the curve to the given line approaches to zero as the point moves to infinity along the branch of curve.

1) Asymptote parallel to x-axis is obtained by equating the coefficient of highest power of x to 0(the
coefficient should not be a constant) in the equation which is called the horizontal asymptote.

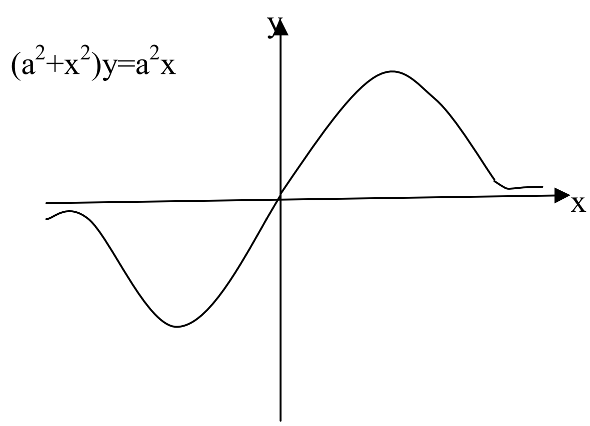

Figure 14

Here x-axis itself is an asymptote

2) Asymptote parallel to y-axis is obtained by equating the coefficient of highest power of y to 0(the
coefficient should not be a constant) in the equation which is called the vertical asymptote.

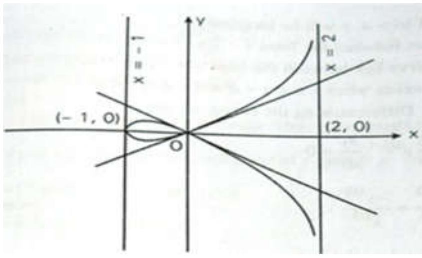

Figure 15

The equation of curve is $y^2 = x^2(1+x)/(2-x)$, here x=2 is an asymptote parallel to y-axis

3) An asymptote which is neither parallel to x-axis nor y-axis is known as **oblique asymptote** which is
obtained by substituting y=mx+c in the equation of curve.

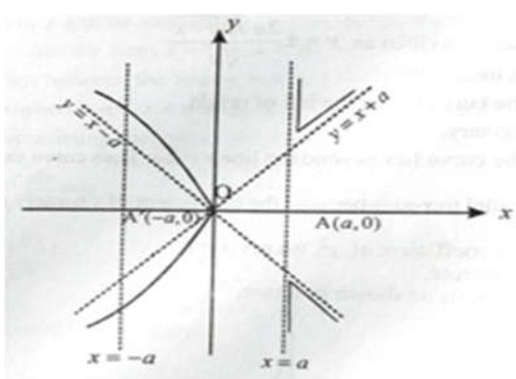

Figure 16

REFERENCES:-

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.

2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

4. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson

. 5. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill

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