countered are the parabola $y - x^2 = 0$, the hyperbola $x^2 - y^2 - 1 = 0$, and the ellipse $x^2/4 + y^2 - 1 = 0$.

You will be assigned one of the following curves to study. For your assigned curve

(a) $H(x, y) = x^3 - xy^2 + 1$

(b) $H(x, y) = x^3 - 2y^2 + \frac{3}{2}$

(c) $H(x, y) = x^3 + y^2 - 2xy - 1$

(d) $H(x, y) = x^3 - x - y^2 + 1$

(e) $H(x, y) = x^3y - x - y^2 + 1$

(f) $H(x, y) = x^3y - x - xy^2 + 1$

(g) $H(x, y) = x^3 - y - x^2y^2 + 1$

(h) $H(x, y) = x^3y - x - x^2y^2 + 1$

(i) $H(x, y) = x^3y - x - x^2y^2 - y^2 + 1$

(j) $H(x, y) = x^2y + x^3 + xy^3 + y + 1$

do the following

(i) Use the **implicitplot** command to plot the portion of the curve that lies in the rectangle $[-4, 2] \times [-4, 5]$ (see Maple/Calculus Notes). Use a fine enough grid so that the curve appears smooth. In the same picture plot the circle $x^2 + y^2 = 1$ and use the **fsolve** command to find all points of intersection of this circle with the assigned curve. Annotate your picture, identifying the respective curves.

(ii) For $h = -.5, 0, .5$, use the **fsolve** command to find all solutions to $H(1 + h, y) = 0$. This will give one or more points $(1 + h, y)$ on the curve. Plot the tangent lines at these points (with suitable length) and the curve itself (for $x \in [0, 2]$) in the same picture. Use colors to distinguish the respective plots. Print out and annotate your picture.

(iii) Define two 1-dimensional arrays `p[i],c[i],i=1..10`. Store your favorite 10 colors in the array `c` (such as `c[2]:=magenta`). Then use a do loop to store the plots of the curves $H(x, y) - i/10 = 0$, for $i = 1, \ldots, 10$, in the array `p`, with `p[i]` in color `c[i]`. Display all the plots in the same picture. Annotate this picture to clearly exhibit which curve goes with which value of i.

8. **(Plane Curves: The Parametric Description)** If two functions $f, g : [a, b] \to \mathbb{R}$ are given on some interval $[a, b]$, then a curve is given parametrically by the two equations:

$$x = f(t)$$
$$y = g(t).$$