$$\frac{\quad}{(x-a_1)} + \frac{\quad}{(x-a_2)} + \cdots$$

$$\frac{\quad}{(x-a)^n} = \frac{\quad}{(\ )^1} + \frac{\quad}{(\ )^2} + \cdots + \frac{\quad}{(\ )^n}$$

$$\frac{Ax+B}{ax^2+bx+c}$$

Ex

$$\frac{3x-5}{x^3-1} = \frac{A}{x-1} + \frac{Bx+C}{x^2+x+1}$$

$$3x-5 = A(x^2+x+1) + (Bx+C)(x-1)$$

x^2 : $A+B=0 \rightarrow B=-A=\frac{2}{3}$

x^1 : $A-B+C=3$ ①

x^0 : $A-C=-5 \rightarrow C=A+5=5-\frac{2}{3}=\frac{13}{3}$

① $\rightarrow A+A+A+5=3$

$3A=-2 \Rightarrow A=-\frac{2}{3}$

$$\frac{3x-5}{x^3-1} = \frac{-2/3}{x-1} + \frac{\frac{2}{3}x+\frac{13}{3}}{x^2+x+1}$$

5)

$$\frac{x^3+x^2}{(x^2+4)^2} = \frac{Ax+B}{x^2+4} + \frac{Cx+D}{(x^2+4)^2}$$

$$x^3 + x^2 = (Ax+B)(x^2+4) + Cx + D$$

x^3 $\quad A = 1$

x^2 $\quad B = 1$

x^1 $\quad 4A + C = 0 \Rightarrow C = -4$

x^0 $\quad 4B + D = 0 \Rightarrow D = -4$

$$\frac{x^3+x^2}{(x^2+4)^2} = \frac{x+1}{x^2+4} + \frac{-4x-4}{(x^2+4)^2}$$

#1

$$\frac{4}{x(x-1)} = \frac{A}{x} + \frac{B}{x-1}$$

$$4 = A(x-1) + Bx$$

x^1 $\quad A + B = 0 \Rightarrow B = 4$

x^0 $\quad -A = 4 \rightarrow A = -4$

$$\frac{4}{x(x-1)} = \frac{-4}{x} + \frac{4}{x-1}$$

#2 $\frac{3x}{(x+2)(x-1)} = \frac{A}{x+2} + \frac{B}{x-1}$

$3x = A(x-1) + B(x+2)$

$x^1 \quad A + B = 3$

$x^0 \quad -A + 2B = 0$

$3B = 3 \Rightarrow B = 1$

$A = +2$

$\frac{3x}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$

#4 $\frac{1}{(x+1)(x^2+4)} = \frac{A}{x+1} + \frac{Bx+C}{x^2+4}$

$1 = A(x^2+4) + (Bx+C)(x+1)$

$x^2 \quad A + B = 0 \Rightarrow A = -B = \frac{1}{5}$

$x^1 \quad B + C = 0 \quad C = -B = \frac{1}{5}$

$x^0 \quad 4A + C = 1$

$-4B - B = 1$

-5

$B = -\frac{1}{5}$

$\frac{1}{(x+1)(x^2+4)} = \frac{1/5}{x+1} + \frac{-\frac{1}{5}x + \frac{1}{5}}{x^2+4}$

5.3

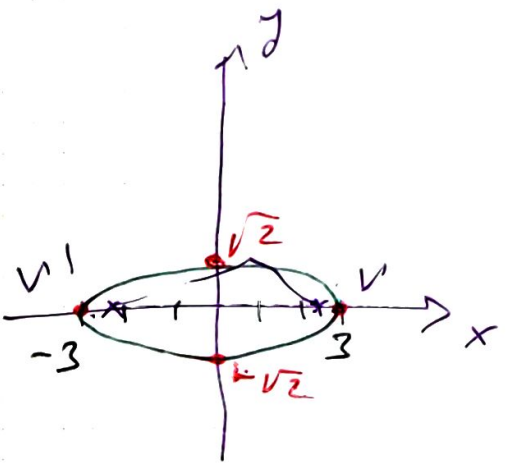
Ex

$$2x^2 + 9y^2 = 18$$

$$\frac{2x^2}{18} + \frac{9y^2}{18} = \frac{18}{18}$$

$$\frac{x^2}{\frac{18}{2}} + \frac{y^2}{\frac{18}{9}} = 1$$

$$\frac{x^2}{9} + \frac{y^2}{2} = 1$$



$a = \pm 3$

Vertices: $(\pm 3, 0)$

$M(0, \pm\sqrt{2})$

foci: $c^2 = a^2 - b^2$

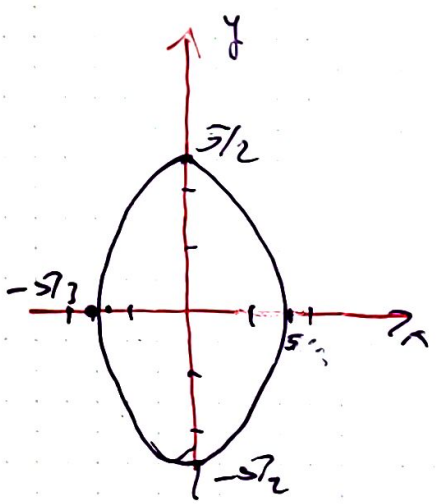
$= 7$

$c = \pm\sqrt{7}$

$$9x^2 + 4y^2 = 25$$

$$\frac{x^2}{\frac{25}{9}} + \frac{y^2}{\frac{25}{4}} = 1$$

$\pm\frac{5}{3}$ $\pm\frac{5}{2}$



$V'(0, \pm 5/2)$

$M'(\frac{-5}{3}, 0)$ $M(\frac{5}{3}, 0)$

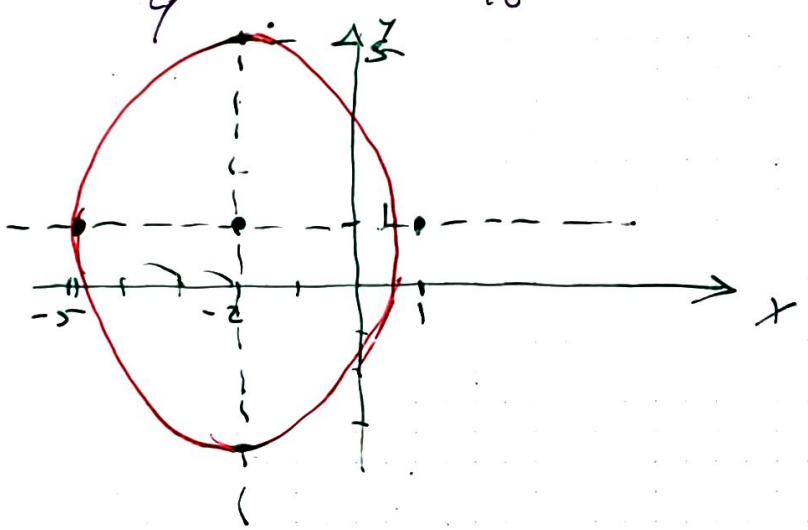
$16x^2 + 9y^2 + 64x - 18y - 71 = 0$

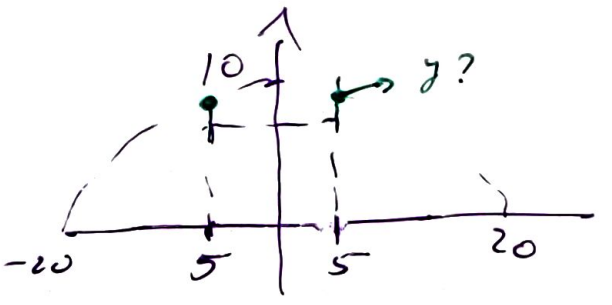
$16x^2 + 64x \;\_\; + 9y^2 - 18y = 71$

$16\left(x^2 + 4x + \left(\frac{4}{2}\right)^2\right) + 9\left(y^2 - 2y + (-1)^2\right) = 71 + 64 + 9$

$16(x+2)^2 + 9(y-1)^2 = 144$

$\frac{(x+2)^2}{9} + \frac{(y-1)^2}{16} = 1$





$$\frac{x^2}{20^2} + \frac{y^2}{10^2} = 1$$

$$\frac{5^2}{20^2} + \frac{y^2}{10^2} = 1$$

$$\frac{y^2}{10^2} = 1 - \frac{25}{400}$$

$$y^2 = 10^2\left(\frac{375}{20^2}\right)$$

$$y = \frac{10}{20}\sqrt{375}$$

$$= \frac{1}{2}\sqrt{375}$$

$\sqrt{10^2} = 10$

$\sqrt{20^2} = 20$