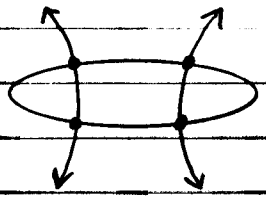
1. $2x^2 + 5y^2 = 98$ → $2x^2 + 5y^2 = 98$

$-1(2x^2 - y^2 = 2)$ → $-2x^2 + y^2 = -2$

$6y^2 = 96$

$y^2 = 16$

$y = \pm 4$



$\{(3,4)(-3,4)(3,-4)(-3,-4)\}$

X	Y
±3	4
±3	-4

2. $x^2 + y^2 = 25$ → $x^2 + y^2 = 25$

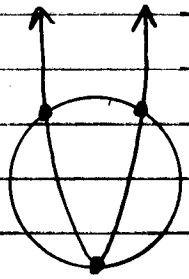
$-1(x^2 - y = 5)$ $-x^2 + y = -5$

$y^2 + y = 20$

$y^2 + y - 20 = 0$

$(y - 4)(y + 5) = 0$

$y = 4, -5$



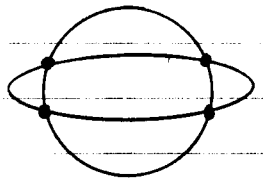
$\{(3,4)(-3,4)(0,-5)\}$

X	Y
±3	4
0	-5

3. $x^2 + 2y^2 = 33 \rightarrow x^2 + 2y^2 = 33$

$-2(x^2 + y^2 + 2x = 19) \rightarrow -2x^2 - 2y^2 - 4x = -38$

$-x^2 - 4x = -5$



$x^2 + 4x = 5$

$x^2 + 4x - 5 = 0$

$(x-1)(x+5) = 0$

$x = 1, -5$

$\downarrow$

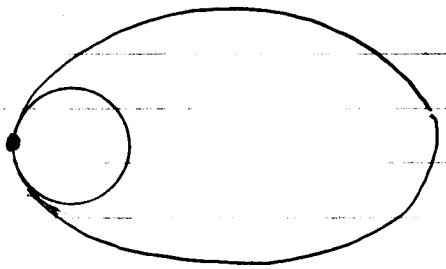
$\{(1,4)\ (1,-4)\ (-5,2)\ (-5,-2)\}$

x	y
1	± 4
-5	± 2

4. $-25(x^2 + y^2 + 8x = -15) \rightarrow -25x^2 - 25y^2 - 200x = 37$

$9x^2 + 25y^2 = 225 \rightarrow 9x^2 + 25y^2 = 225$

$-16x^2 - 200x = 600$



$2x^2 + 25x = -75$

$2x^2 + 25x + 75 = 0$

$(2x+15)(x+5) = 0$

$x = -15/2, -5$

$\downarrow$

$\{(-5,0)\}$

x	y
-15/2	No Solution
-5	0

5. $5x^2 + 9y^2 = 161$

$-5(x^2 - 4y = 4)$ →

$5x^2 + 9y^2 = 161$

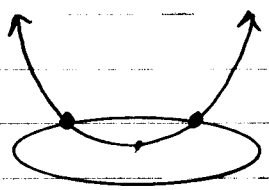
$-5x^2 + 20y = -20$

$9y^2 + 20y = 141$

$9y^2 + 20y - 141 = 0$

$(9y + 47)(y - 3) = 0$

$y = -47/9, 3$



$\{(4, 3)\ (-4, 3)\}$

X	Y
No Solution	$-47/9$
± 4	3

6. $16x^2 - 3y^2 = -11$

$8x - y = -11$

$y = 8x + 11$

$16x^2 - 3(8x+11)^2 = -11$

$16x^2 - 3(64x^2 + 176x + 121) =$

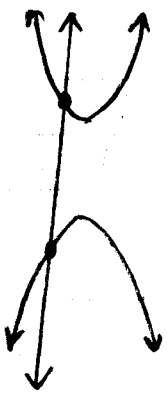
$16x^2 - 192x^2 - 528x - 363 = -$

$-176x^2 - 528x - 352 = 0$

$x^2 + 3x + 2 = 0$

$(x + 2)(x + 1) = 0$

$x = -2, -1$



$\{(-2, -5)\ (-1, 3)\}$

X	Y
-2	-5
-1	3

7. $x^2 + 9y^2 - 10x + 36y = 20$

$x - 3y = 2$

$\downarrow$

$x = 2 + 3y$

$(2+3y)^2 + 9y^2 - 10(2+3y) + 36y = 20$

$4 + 12y + 9y^2 + 9y^2 - 20 - 30y + 36y = 20$

$18y^2 + 18y - 36 = 0$

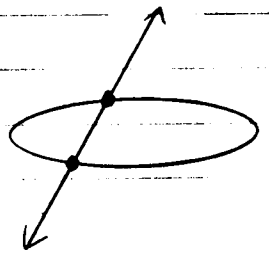
$y^2 + y - 2 = 0$

$(y-1)(y+2) = 0$

$y = 1, -2$

$\downarrow$

x	y
5	1
-4	-2



$\{(5,1)\ (-4,-2)\}$

8. $x^2 + 2y^2 = 33$

$3x + 2y = -11$

$\downarrow$

$2y = -3x - 11$

$y = -3/2x - 11/2$

$x^2 + 2(-3/2x - 11/2)^2 = 33$

$x^2 + 2(9/4x^2 + 66/4x + 121/4) = 33$

$x^2 + 9/2x^2 + 66/2x + 121/2 = 33$

$2x^2 + 9x^2 + 66x + 121 = 66$

$11x^2 + 66x + 55 = 0$

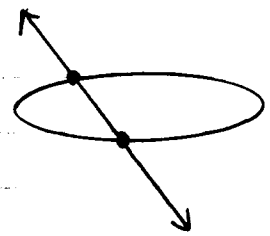
$x^2 + 6x + 5 = 0$

$(x+5)(x+1) = 0$

$x = -5, -1$

$\downarrow$

x	y
-5	2
-1	-4



$\{(-5,2)\ (-1,-4)\}$