

## Ellipses

Identify the coordinates of the center, the foci and vertices of the following ellipses

Ex.  $9x^2 + 4y^2 - 18x + 16y - 11 = 0$   
 $9x^2 - 18x + 4y^2 + 16y - 11 = 0$   
 $9(x^2 - 2x) + 4(y^2 + 4y) = 11$   
 $9(x^2 - 2x + \underline{\quad}) + 4(y^2 + 4y + \underline{\quad}) = 11$   
 $\quad\quad\quad -1 \quad\quad\quad +2$   
 $9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) = 11 + 9 + 16$   
 $9(x - 1)^2 + 4(y + 2)^2 = 36$   
 $\frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} = 1$   
 $\frac{(x-1)^2}{2^2} + \frac{(y+2)^2}{3^2} = 1$

Regrouping

$\frac{1}{2}$  and square

Complete Sq. & add both sides  
Factor

Div. Prop of =

Ctr (1, -2)

Major axes;  $a = 3, b = 2$

$a^2 = b^2 + c^2; \quad 9 - 4 = c^2, \quad c = \pm\sqrt{5}$

$F(1, -2 + \sqrt{5}), F'(-2 - \sqrt{5})$

$V(1, 1), V'(1, -5)$

1.  $x^2 + 4y^2 - 6x + 8y - 4 = 0$
2.  $3x^2 + 2y^2 - 12x + 8y + 5 = 0$
3.  $2x^2 + y^2 - 8x + 6y - 9 = 0$
4.  $x^2 + 3y^2 - 4x + 12y + 4 = 0$
5.  $4x^2 + y^2 - 8x + 6y - 9 = 0$
6.  $x^2 + 2y^2 - 4x + 4y - 1 = 0$
7.  $3x^2 + y^2 - 12x + 2y + 9 = 0$
8.  $2x^2 + 3y^2 - 8x + 12y - 16 = 0$
9.  $x^2 + 2y^2 - 10x + 6y + 9 = 0$
10.  $3x^2 + 4y^2 - 6x + 8y - 4 = 0$