

$$5) \quad 16x^2 + 9y^2 - 64x - 54y + 1 = 0$$

$$16x^2 - 64x + 9y^2 - 54y + 1 = 0$$

$$16(x^2 - 4x) + 9(y^2 - 6y) + 1 = 0$$

$$16(x^2 - 4x + 4) + 9(y^2 - 6y + 9) + 1 = 0$$

$$16(x-2)^2 + 9(y-3)^2 + 1 = 64 + 81$$

-1                      -1

$$16(x-2)^2 + 9(y-3)^2 = 144$$

$$\frac{(x-2)^2}{9} + \frac{(y-3)^2}{16} = 1$$

Ellipse:  $a=4$ ,  $b=3$ ,  $\Rightarrow c=\sqrt{7}$       Vertical Axis

Center:  $(h, k) = (2, 3)$

Vertices:  $(h, k \pm a): (2, 7)(2, -1)$

Foci:  $(2, 3 \pm \sqrt{7})$

