$x^2 - 4x + 9y^2 - 54y = -4$

Ellipse or not ? Yes, this is an ellipse.

$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

Find the standard equation of an ellipse by completing the square

$x^2 - 4x + 9y^2 - 54y = -4$

$x^2 - 4x + 4 + 9(y^2 - 6y + 9) = -4 + 4 + 81$

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

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$\frac{(x-2)^2}{81} + \frac{9(y-3)^2}{81} = \frac{81}{81}$

$\boxed{\frac{(x-2)^2}{81} + \frac{(y-3)^2}{9} = 1}$

$h=2, k=3$

$(h-a, k)$ $(h+a, k)$

$(-7, 3)$ $(11, 3)$

Center: $(2,3)$

Vertices: $(-7,3)$, $(11,3)$

Covertices: $(2,0)$, $(2,6)$

$c^2 = 81 - 9 = 72$

$c = \sqrt{72}$

Focus points: $(2-\sqrt{72}, 3)$; $(2+\sqrt{72}, 3)$.

Ex: Complete the square to find the standard equation of the ellipse: $9x^2 - 18x + y^2 - 27 = 0$

Center? Vertices? Covertices ? Focus Points ?

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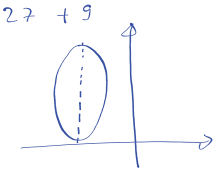
$\frac{(x-2)^2}{?} + \frac{y^2}{63} = 1$

$9x^2 - 18x + y^2 - 27 = 0$

$9(x^2 - 2x + 1) + y^2 = 27 + 9$

$9(x-1)^2 + y^2 = 36$

$\boxed{\frac{(x-1)^2}{4} + \frac{y^2}{36} = 1}$



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