$$
\begin{aligned}
& \text { Given: } 25 x^{2}+50 x-9 y^{2}-18 y-209=0 \\
& \text { 1. } 25 x^{2}+50 x-9 y^{2}-18 y=209 \\
& \text { 2. } 25 x^{2}+50 x-9 y^{2}-18 y=209 \\
& \text { 5-9. } 25(x+1)^{2}-9(y+1)^{2}=209+25-9 \\
& \text { 10. } 25(x+1)^{2}-9(y+1)^{2}=225 \\
& \text { 11. } 25(x+1)^{2} / 225{ }^{-} 9(y+1)^{2} / 225=225 / 225 \\
& \text { 12. }(x+1)^{2} / 9-(y+1)^{2} / 25=1
\end{aligned}
$$

1. Get all integers moved to other side
2. Get like variables together and factor each variable group separately.
3. Is there a coefficient in front of the squared term?

Yes - FACTOR IT OUT watch out for signs

4. Now set up the perfect square format $\left(x \pm \mathcal{S}^{2}\right)^{2}$ or $\left(y \pm\{ )^{2}\right.$
5. Take $1 / 2$ of the linear term fill in to perfect square
6. Take that value, square it and add into the equation above
7. Now we have added a bunch of numbers to the left side of the equation and need to balance both sides. From the $x$ 's, how much have we added? Remember to distribute the coefficient!!!
8. What about the y's?
9. Now add or subtract these amounts to the right side.
10. Simplify
11. Divide through by the integer to get into proper form for ellipses and hyperbolas
12. simplify fractions
13. What type of conic section is does this equation model?

| Circle | both $x^{2}$ and $y^{2}$ <br> $x^{2}$ and $y^{2}$ ADDED | Ellipse | both $x^{2}$ and $y^{2}$ <br> $x^{2}$ and $y^{2}$ ADDED <br> COEFFICIENTS INFRONT OF SQUARED TERMS (not equal) <br> Leader of the band has the biggest denominator a |
| :--- | :--- | :--- | :--- |
| Hyperbola | both $x^{2}$ and $y^{2}$ <br> $x^{2}$ and $y^{2}$ SUBTRACTED <br> COEFFICIENTS INFRONT OF SQUARED TERMS <br> Leader of the band is FIRST denominator; <br> size does not matter | Parabola | ONLY $x^{2}$ OR $y^{2}$ <br> $x$ and $y$ are on separate sides of the equal sign <br> the squared term gets the leading coefficient a |

