Steps — solve using completing the square

Ex. $7x = 4x^2 - 1$

1. Simply and collect like terms and arrange in standard form

$4x^2 - 7x - 1 = 0$

$a=4 \quad b=-7 \quad c=-1$

2. Factor out coefficient of x^2 from 1st 2 terms

$4\left(x^2 - \frac{7}{4}x\right) - 1 = 0$

3. Divide the coefficient of x by 2 and square it

$\left(-\frac{7}{4} \div 2\right)^2 = \left(\frac{7}{8}\right)^2 = \frac{49}{64}$

4. Add and subtract what's on step 3 inside bracket

$4\left(x^2 - \frac{7}{4}x + \frac{49}{64} - \frac{49}{64}\right) - 1 = 0$

5. Creat PST (Perfect square trinomial)

$4\left[\left(x - \frac{7}{8}\right)^2 - \frac{49}{64}\right] - 1 = 0$

6. Get rid of barchet by using distributive property

$4\left(x - \frac{7}{8}\right)^2 - \frac{49}{16} - 1 = 0$

7. Add numbers

$4\left(x - \frac{7}{8}\right)^2 - \frac{65}{16} = 0$

8. Move numbers to other side

$4\left(x - \frac{7}{8}\right)^2 = \frac{65}{16}$

9. Divide by coefficient of x^2

$\left(x - \frac{7}{8}\right)^2 = \frac{65}{64}$

10. Square root both sides

remember to consider $\pm$

$x - \frac{7}{8} = \pm\sqrt{\frac{65}{64}}$

$x - \frac{7}{8} = \pm\frac{\sqrt{65}}{8}$

11. Move members to other side

$x = \frac{7}{8} \pm \frac{\sqrt{65}}{8}$

12 simplify

$x = \frac{7 \pm \sqrt{65}}{8}$

$x = \frac{7+\sqrt{65}}{8} \quad x = \frac{7-\sqrt{65}}{8}$

Steps — solve using completing the square — Ex. $ax^2+bx+c=0$

1. Simply and collect like terms and arrange in standard form

2. Factor out coefficient of x^2 from 1st 2 terms $a\left(x^2+\frac{b}{a}x\right)+c=0$

3. Divide the coefficient of x by 2 and square it $\frac{b}{2a}$ $\left(\frac{b}{2a}\right)^2=\frac{b^2}{4a^2}$

4. Add and subtract what's on step 3 inside bracket $a\left(x^2+\frac{b}{a}x+\frac{b^2}{4a^2}-\frac{b^2}{4a^2}\right)+c=0$

5. Creat PST — Perfect square trinomial — big — binomial $a\left[\left(x+\frac{b}{2a}\right)^2-\frac{b^2}{4a^2}\right]+c=0$

6. Get rid of bracket by using distributive property $a\left(x+\frac{b}{2a}\right)^2-\frac{b^2}{4a}+c=0$

7. Add numbers $a\left(x+\frac{b}{2a}\right)^2+\frac{-b^2+4ac}{4a}=0$

8. Move numbers to other side $a\left(x+\frac{b}{2a}\right)^2=\frac{b^2-4ac}{4a}$

9. Divide by coefficient of x^2 a $\left(x+\frac{b}{2a}\right)^2=\frac{b^2-4ac}{4a^2}$

10. Square root both sides — remember to consider ± $x+\frac{b}{2a}=\pm\sqrt{\frac{b^2-4ac}{4a^2}}$

11. Move members to other side $x+\frac{b}{2a}=\pm\frac{\sqrt{b^2-4ac}}{2a}$ $x=-\frac{b}{2a}\pm\frac{\sqrt{b^2-4ac}}{2a}$

12. simplify $x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

Quadratic Formula!