Solving the Different Quadratic Functions

$ax^2+bx+c=0$

-GCF -DOTS -X method -slip n slide -grouping

Factorable

must be = to 0

Ex: $6x^2 - 21x = -15$

$+15 \quad +15$

$6x^2-21x+15=0$

$3(2x^2-7x+5)=0$

$10 \cdot 2 = 20$, $-5-2=-7$ → $\{\frac{5}{2}, 1\}$

$3(x-\frac{5}{2})(x-\frac{2}{2})=0$

$3(2x-5)(x-1)=0$

$2x-5=0 \quad x-1=0$

$+5 \quad +5 \quad +1 \quad +1$

$\frac{2x}{2}=\frac{5}{2} \quad x=1$

$x=\frac{5}{2}$

Ex: $2x^2 - 3x = 9$

$-9 \quad -9$

$2x^2-3x-9=0$

-18, $-6-3=-3$ → $(x-6)(x+3)=0$

$(x-3)(2x+3)=0$

$x-3=0 \quad 2x+3=0$

$+3 \quad +3 \quad -3 \quad -3$

$x=3 \quad \frac{2x}{2}=\frac{-3}{2}$

$x=-\frac{3}{2}$

$ax^2+bx+c=0$

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Can't Factor – Use [redacted] Completing the Squares

Ex: $x^2+6x+3=0$

$-3 \quad -3$

$x^2+6x+9=-3+9$

$(\frac{6}{2})^2=(\frac{6}{2})^2=(3)^2$

$9 \cdot 6 = 54$, $3-6=-3$ → $\sqrt{(x+3)^2}=\sqrt{6}$

$x+3=\pm\sqrt{6}$

$-3 \quad -3$

$x=-3\pm\sqrt{6}$

Ex: [redacted]

$ax^2+c=0$

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Take Square Roots

Ex: $3x^2 - 7 = 47$

$+7 \quad +7$

$\frac{3x^2}{3}=\frac{54}{3}$

$\sqrt{x^2}=\sqrt{18}$

$x=\pm 3\sqrt{2}$

Ex: $x^2 - 21 = 4$

$+21 \quad +21$

$\sqrt{x^2}=\sqrt{25}$

$x=\pm 5$

Ex: $-\frac{3}{5}x^2 - 2 = -5$

$+2 \quad +2$

$-5 \cdot -3 = 15$, $-3-5=-8$ → $x^2=-3\cdot\frac{-5}{3}$

$\sqrt{x^2}=\sqrt{5}$

$x=\pm\sqrt{5}$

$(ax+c)^2=0$

Take Square Roots

Ex: $(2x+6)^2 - 8 = 24$

$+8 \quad +8$

$\sqrt{(2x+6)^2}=\sqrt{32}$

$2x+6=\pm 4\sqrt{2}$

$-6 \quad -6$

$\frac{2x}{2}=\frac{-6\pm 4\sqrt{2}}{2}$

$x=-3\pm 2\sqrt{2}$

Ex: $\frac{1}{3}(x+4)^2 - 1 = 5$

$+1 \quad +1$

$\frac{1}{3}(x+4)^2=6\cdot 3$

$\sqrt{(x+4)^2}=\sqrt{18}$

$x+4=\pm 3\sqrt{2}$

$-4 \quad -4$

$x=-4\pm 3\sqrt{2}$

✪Special Case when x^2 is inside✪

Ex: $2(x^2 - 5) = -x^2 - 1$

$2x^2-10=-x^2-1$

$+x^2 \quad +x^2$

$3x^2-10=-1$

$+10 \quad +10$

$\frac{3x^2}{3}=\frac{9}{3}$

$\sqrt{x^2}=\sqrt{3}$

$x=\pm\sqrt{3}$