## Notes Quadratic Equations

There are 4 ways to solve quadratic equations:
I. FACTORING

1. Get into Standard form $a x^{2}+b x+c=0$.
2. Factor (this includes GCF, Difference of Squares, Trinomials and Grouping)
3. Set each factor equal to zero and solve for the variable.

Solve the following equations.

| EX1: $2 x^{2}-5 x-12=0$ | EX2: $6 x^{2}-54=0$ | EX3: $9 x^{2}-4 x-4=2 x-5$ |
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## II. EXTRACTION OF ROOTS

1. Isolate the expression that you are squaring.
2. Take the Square Root of both sides of the equation (be sure to write a $\pm$ with the number you took the square root of)
3. Solve the resulting equations.

Solve the following equations.

| EX4: $7 x^{2}=4$ | EX5: $(5 x+3)^{2}=-4$ | EX6: $2(2 x+1)^{2}+3=11$ |
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## III. COMPLETING THE SQUARE

1. Get into Standard form $a x^{2}+b x+c=0$.
2. If $a$ is NOT 1 , divide everything in the equation by $a$.
3. Move $c$ to the right hand side of the equation and add a + $\qquad$ to both sides $x^{2}+b x+$ $\qquad$ $=-c+$ $\qquad$
4. Add $\left(\frac{1}{2} b\right)^{2}$ to both sides of the equation.
5. Factor the left hand side (it is a squared binomial) and add the right
6. Solve by Extraction of Roots

Solve the following equations.

| Ex7: $2 x^{2}+14 x+4=0$ | Ex8: $x^{2}-6 x+7=0$ |
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## IV. THE QUADRATIC FORMULA

1. Get into Standard form $a x^{2}+b x+c=0$.
2. Identify $a, b$, and $c$.
3. Substitute your $a, b$, and $c$ into the quadratic formula

$$
x=\frac{-b \pm \sqrt{b^{2}-4 a c}}{2 a}
$$

4. Simply and reduce

Solve the following equations.

| Ex9: $x^{2}-4 x+1=0$ | Ex10: $3 x^{2}+6 x=0$ | Ex11: $(3 x-5)(3 x-3)=-1$ |
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