Solving Quadratic Equations by taking Square Roots

1. Get x^2 or binomial squared by itself
2. Take the square root of BOTH sides of the equals sign
3. Don't forget the ± sign
4. Simplify

Solving by taking square roots

- An alternate method of solving a quadratic equation is using the Principle of Taking the Square Root of Each Side of an Equation

If $x^2 = a$, then $x = \pm\sqrt{a}$

Ex: Solve by taking square roots $3x^2 - 36 = 0$

First, isolate x^2: $3x^2 - 36 = 0$

$3x^2 = 36$

$x^2 = 12$

Now take the square root of both sides:

$$\sqrt{x^2} = \sqrt{12}$$

$$x = \pm\sqrt{12}$$

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

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

Ex: Solve by taking square roots $4(z-3)^2 = 100$

First, isolate the squared factor:

$4(z-3)^2 = 100$

$(z-3)^2 = 25$

Now take the square root of both sides:

$$\sqrt{(z-3)^2} = \sqrt{25}$$

$$z - 3 = \pm\sqrt{25}$$

$z - 3 = \pm 5$

$z = 3 \pm 5$

$\rightarrow z = 3 + 5 = 8$ and $z = 3 - 5 = -2$

Ex: Solve by taking square roots $5(x+5)^2 - 75 = 0$

First, isolate the squared factor:

$5(x+5)^2 = 75$

$(x+5)^2 = 15$

Now take the square root of both sides:

$$\sqrt{(x+5)^2} = \sqrt{15}$$

$$x + 5 = \pm\sqrt{15}$$

$$x = -5 \pm \sqrt{15}$$

$$x = -5 + \sqrt{15}, \quad x = -5 - \sqrt{15}$$

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Solve Quadratics by Taking the Square Root

Find the value of the variable. Round to the nearest hundredth if necessary.

1) $g^2 = 64$

2) $r^2 = 14$

3) $g^2 = 12$

4) $r^2 = 4$

5) $m^2 = 7$

6) $r^2 = 40$

7) $y^2 = 25$

8) $y^2 = 64$

9) $s^2 = 5$

10) $r^2 = 36$

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Solve Quadratics by Taking the Square Root

Find the value of the variable. Round to the nearest hundredth if necessary.

1) $w^2 + 10 = 50$

2) $q^2 + 5 = 33$

3) $q^2 - 6 = 19$

4) $y^2 - 4 = 1$

5) $p^2 + 3 = 43$

6) $d^2 + 7 = 21$

7) $q^2 + 4 = 22$

8) $s^2 - 4 = 21$

9) $r^2 - 4 = -1$

10) $m^2 + 6 = 30$

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Solving Quadratic Equations Using Square Roots

UNIT QUESTION: How are real life scenarios represented by quadratic functions?

Today's Question: When does a quadratic have an imaginary solution? *MCC9-12.A.REI.4b*

Solving Quadratic Equations Using Square Roots

1. Get x^2 by itself. or get binomial squared by itself
2. Take the square root of both sides of the equation.
3. There will ALWAYS be a positive answer and a negative answer.
4. Check your answers!!!

Solve each equation.

1. $x^2 - 4 = 0$

2. $\frac{1}{2}x^2 + 3 = 12$

3. $2(x^2 - 5) = -x^2 - 1$

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

5. $4(x+5)^2 = 64$

6. $2x^2 - 338 = 0$

7. $5(x-4)^2 = 125$

8. $\frac{1}{7}x^2 - 3 = 4$

GSE Algebra I Quadratics

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Solving Quadratics by Using Square Roots

Solve each quadratic equation.

1. $x^2 + 4 = 29$	2. $3x^2 - 7 = 47$	3. $x^2 + 11 = 16$
4. $(x+4)^2 = 121$	5. $(2x-3)^2 = 9$	6. $(x-7)^2 = 99$
7. $(x+3)^2 + 6 = 18$	8. $(2x+6)^2 - 8 = 24$	9. $x^2 + 21 = 5$
10. $3(x+4)^2 = 9$	11. $3(x^2-4) = 2x^2 - 1$	12. $\frac{2}{5}x^2 - 3 = 7$
13. $x^2 - 14x + 13 = 0$	14. $2x^2 - 7x = x^2 - 12$	15. $2x^2 - 15 = -7x$