Name: _____ Key _____ Date: _____

Solving Quadratic Equations Using Square Roots

Solving Quadratic Equations Using Square Roots

1. Get what is "squared" by itself.
2. Take the square root of both sides of the equation.
3. There will <u>ALWAYS</u> be a positive answer and a negative answer.
4. Check your answers!!!

Class Problems   **You Try!**

Solve each equation.

1. $x^2 - 4 = 0$

$\quad +4 \quad +4$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

2. $\dfrac{9x^2}{9} = \dfrac{243}{9}$

$\sqrt{x^2} = \sqrt{27}$

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

3. $2x^2 - 338 = 0$

$2x^2 = 338$

$\sqrt{x^2} = \sqrt{169}$

$x = \pm 13$

4. $3x^2 - 300 = 0$

$3x^2 = 300$

$\sqrt{x^2} = \sqrt{100}$

$x = \pm 10$

5. $\dfrac{1}{7}x^2 - 3 = 4$

$\dfrac{1}{7}x^2 = 7$

$\sqrt{x^2} = \sqrt{49}$

$x = \pm 7$

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

$\dfrac{1}{2}x^2 = 9$

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

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

7. $2(x^2 - 5) = -x^2 - 1$

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

$3x^2 - 10 = -1$

$3x^2 = 9$

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

$x = \pm 3$

8. $3(x^2 + 2) = x^2 + 24$

$3x^2 + 6 = x^2 + 24$

$2x^2 + 6 = 24$

$2x^2 = 18$

$x^2 = 9$

$x = \pm 3$

9. $5(x-4)^2 = 125$

$\sqrt{(x-4)^2} = \sqrt{25}$

$x - 4 = \pm 5$

$x = 4 \pm 5$

$\boxed{x = 9, -1}$

10. $4(x+5)^2 = 64$

$\sqrt{(x+5)^2} = \sqrt{16}$

$x + 5 = \pm 4$

$x = -5 \pm 4$

$\boxed{x = -1, -9}$

Falling Objects

$$h = -16t^2 + h_0$$

h_0 is the initial height.

h is the ending height.

11. The tallest building in the USA is in Chicago, Illinois. It is 1450 ft. tall. How long would it take a penny to drop from the top of the building to the ground?

$0 = -16t^2 + 1450$

$-1450 = -16t^2$

$\sqrt{\dfrac{1450}{16}} = \sqrt{t^2}$ $\boxed{t = 9.52 \text{ sec}}$

12. For a period of 48 months, the average monthly operating costs for a small business C (in dollars) is approximated by the model $C = 0.55t^2 + 550$ where t is the number of months. During which month was the average operating cost $1430?

$1430 = 0.55t^2 + 550$

$880 = 0.55t^2$

$1600 = t^2$

$\boxed{t = 40}$