ACW6U1

Linear Equation	Quadratic Equation	
$4x - 5 = 31$	$4x^2 - 5 = 31$	**different:** The variable is $4x$ in the linear equation and $4x^2$ in the quadratic equation.
$4x - 5 + 5 = 31 + 5$	$4x^2 - 5 + 5 = 31 + 5$	**same:** Add 5 to each side.
$4x = 36$	$4x^2 = 36$	**same:** Simplify.
$\dfrac{4x}{4} = \dfrac{36}{4}$	$\dfrac{4x^2}{4} = \dfrac{36}{4}$	**same:** Divide each side by 4.
$x = 9$	$x^2 = 9$	**same:** Simplify.
		different: 9 is the solution of the linear equation, but the x in the quadratic equation is not isolated.
	$x = \pm\sqrt{9}$	**different:** Must use the definition of square root.
	$x = \pm 3$	**different:** Must evaluate the square roots. The quadratic equation has two solutions, −3 and 3.

Quadratic equations have a variable that is *squared*.
Often you can use *square roots* to solve these equations.

Problem 1

Solve $3x^2 + 7 = 55$.

The exponent 2 means that x is *squared*.
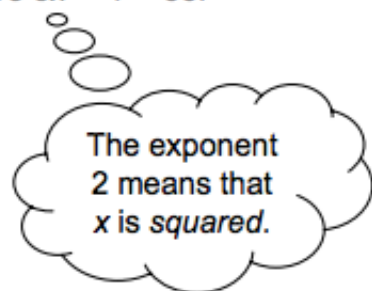
$$3x^2 + 7 = 55$$
$$\underline{\quad -7 \quad -7 \quad}$$ Subtract 7 from each side.
$$3x^2 = 48$$
$$\frac{3x^2}{3} = \frac{48}{3}$$ Divide each side by 3.
$$x^2 = 16$$ The left side is x *squared*. Find the *square roots* of 16.
$$x = \pm\sqrt{16}$$
$$x = \pm 4$$ The $\pm$ shows there are two solutions. They are +4 and −4.

Solve. If the equation has no solution, give that as your answer.

1. $x^2 - 25 = 0$

2. $x^2 + 25 = 0$

3. $6x^2 - 6 = 0$

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4. $-3x^2 + 27 = 0$

5. $-2x^2 - 1 = 0$

6. $4x^2 - 100 = -100$

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7. $x^2 - 121 = 0$

8. $x^2 - 49 = 0$

9. $x^2 - 16 = 20$

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10. $(x + 5)^2 - 6 = 43$

11. $(x - 1)^2 - 19 = 81$

12. $(x - 14)^2 + 13 = 14$