# 4.3 – Solving a Second-Degree Equation

In this lesson we will be solving second-degree equations. Second-degree equations contain a variable that has an exponent of two.

**Class Notes –** State the degree of each equation. Identify the equation as a first-degree equation or a second-degree equation.

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|---|---|---|---|
| **LP#1** $x^2 = 16$ | $w + 3 = 15$ | $y^2 = 36$ | $3z = 42$ |
| **LP#2** $x^2 + 10 = 35$ | $100 = 4w^2$ | $10z = 120$ | $4x^2 = 400$ |
| **LP#3** $w^2 + w = 6$ | $y^4 = 16$ | $x^2 = 4$ | $x^2 - x = 12$ |

**Class Notes –** A solution to each equation is given. Check to see if the solution is correct or incorrect.

| | | | |
|---|---|---|---|
| **LP#4** | $x^2 = 16$<br>$x = 4$ | $y^2 = 36$<br>$y = 6$ | $m^2 = 400$<br>$m = 15$ |
| **LP#5** | $x^2 + 10 = 35$<br>$x = 5$ | $4x^2 = 400$<br>$x = 9$ | $100 = 4w^2$<br>$w = 5$ |

Go to http://en.wikipedia.org/wiki/Equations#Properties. Read the section titled "Properties". Which of the five properties must we use when solving the equation $x^2 = 49$?

| State which property to use here. | Solve the equation here. |
|---|---|
| | |

**Class Notes –** Solve each second-degree equation and check. If you do not solve an equation, explain why.

| | | |
|---|---|---|
| **LP#6**<br>$x^2 = 121$ | $m^2 = 64$ | $x = 49$ |
| **LP#7**<br>$x^2 = 144$ | $x = 169$ | $p^2 = 25$ |
| **LP#8**<br>$x^2 + 9 = 13$ | $x - 5 = 20$ | $x^2 - 20 = 61$ |

**Review** – Solve each second-degree equation and check. If an equation is not a second-degree equation write "not a second-degree equation".

| | |
|---|---|
| **R#1**<br>$x^2 = 49$ | $x^2 = 169$ |
| **R#2**<br>$x^2 = 4$ | $x + 2 = 38$ |
| **R#3**<br>$x^2 + 10 = 26$ | $2x^2 = 50$ |

**Homework**

Evaluate.

**1)** $3^2 =$ **2)** $8^2 =$ **3)** $12^2 =$ **4)** $5^2 =$ **5)** $2^2 =$

**6)** $9^2 =$ **7)** $4^2 =$ **8)** $7^2 =$ **9)** $1^2 =$ **10)** $11^2 =$

**11)** $10^2 =$ **12)** $6^2 =$ **13)** $13^2 =$ **14)** $20^2 =$ **15)** $15^2 =$

Solve each second-degree equation and check.

**16)** $x^2 = 100$ **17)** $m^2 = 81$ **18)** $p^2 = 100 + 21$ **19)** $p^2 = 16$

**20)** $x^2 = 30 - 5$ **21)** $m^2 = 9$ **22)** $x^2 = 30 - 5$ **23)** $m^2 = 30 + 19$

**24)** $x^2 + 10 = 74$ **25)** $x^2 - 4 = 32$ **26)** $2x^2 = 200$ **27)** $3x^2 = 12$

**Synthesis**

The area of a square is 9 in$^2$. Let $m$ represent the measure of one of the sides in inches. Create a second-degree equation that you could solve to determine the length of the side $m$. Solve the equation and state the dimensions of the square.