

Self review material for: Quadratic Equations.

## Self Review Materials

### Quadratic Equations

#### Highline Community College

#### What is a quadratic equation:

In algebra, a quadratic equation is any equation that can be manipulated into the form  $ax^2 + bx + c = 0$  where “a” “b” and “c” are numbers. “a” is not zero, “b” and “c” may or may not be zero. Some authors will call quadratic equations “second degree equations.” The solution of a quadratic equation is a value or values for “x” that will make the equation true. e. g.  $4x^2 - 16 = 0$  has solutions  $x = +2$  and  $x = -2$  also written  $x = \pm 2$ .

It is not always obvious that an equation is quadratic. Recognizing such equations is one of the skills you will need to develop.

#### Samples of Quadratic Equations:

$$x^2 - 4 = 0 \text{ solve for } x$$

$$3 - \frac{(x+2)^2}{4} = \frac{x^2}{4} + 7x \text{ solve for } x$$

$$\frac{6-k}{6k} = \frac{1}{k+1} \text{ solve for } k$$

$$A = 2w^2 + 4lw \text{ solve for } w$$

#### Methods for solving quadratic equations:

There are four ways of solving quadratic equations: **Factoring**, **square root**, completing the square, and the **quadratic formula**. Memorize:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  (quadratic formula).

#### Sample solution by completing the square:

$$x^2 + 10x = 3$$

$$x^2 + 10x + 25 = 3 + 25. \text{ Note: } \left(\frac{10}{2}\right)^2 = 25. \text{ We have added the same term to both sides.}$$

$$(x+5)^2 = 28$$

$$\sqrt{(x+5)^2} = \sqrt{28}$$

$$x+5 = \pm 2\sqrt{7}$$

$$x = -5 \pm 2\sqrt{7}$$

Student should check both answers

Self review material for: Quadratic Equations.

### Resources for review:

**Print:** Check a late beginning or early intermediate algebra textbook for material on quadratic equations. Look in the table of contents and the index for an entry “equations – quadratic” or “quadratic equations” “completing the square,” “quadratic formula.”

Aufman, Baker, Lockwood, Intermediate Algebra with applications (library call number 512 A918i 1992). Chapter 7 – Quadratic Equations

Tobey/ Slater, Beginning Algebra, Chapter 8 (Library call number 512 T628b)

Angel, Allen, Beginning Algebra, Chapter 10 (Library call number 512 A581e)

**Video:** There are several video presentations available in the HCC library media center on the 6th floor. Read a textbook first, then look at the video.

CD Lecture for Tobey/ Slater Intermediate Algebra, Disc 8, library call number 512.9/I612/2002b.

Angel, Allen, tapes to accompany Beginning Algebra, Video 10 (library call number 512 A58e 2000)

**Web sites:** [www.sosmath.com/algebra/algebra.html](http://www.sosmath.com/algebra/algebra.html) click on the quadratic equations link.

### Practice Problems:

- $-4x^2 = 9x$  solve for x
- $a^2 + b^2 = 100$  solve for a
- $(2z - 7)^2 = 25$  solve for z
- $1 + \frac{2}{b-1} = \frac{2}{b^2 - b}$  solve for b
- $W = I^2R$  solve for I
- $\frac{2x+11}{x+4} + \frac{x-2}{x-4} = \frac{12}{x^2-16} + \frac{7}{2}$
- $d(d+1) = 20$  solve for d
- Hint 2: Isolate radicals, then square both sides:  
 $3 + \sqrt{4\lambda + 1} = 0$  solve for  $\lambda$
- $(c+3)(c-4) = 2$  solve for c
- $q = 2 + \sqrt{q-2}$  solve for q
- Hint 1: division by zero is not allowed.  
 $(2n+1)(n-1) = (n-1)(n+5)$  solve for n
- $\sqrt{2x+6} - \sqrt{x+4} = 1$
- $3x^2 + 2x - 33 = 0$  solve for x
- $3 - \frac{(y+2)^2}{4} = \frac{y^2}{4} + 7y$
- $64 = 80t - 16t^2$  solve for t
- Complete the square to solve for x:  
 $ax^2 + bx + c = 0$

*Special thanks to Helen Burn and Brian Jenks for preparing these materials.*