Algebra 2

Ch. 5 Handout 5.5

Quadratic Equations

Standard form of a quadratic equation is $ax^2 + bx + c = 0$, where $a \neq 0$. You can solve some quadratic equations in standard from by factoring the quadratic expression and the using the Zero-Product Property.

Zero-Product Property

* set. Q.E. = 0
* then factor

If ab = 0, then a = 0 or b = 0

Example: If $(x+3)(x-7) = 0$, then $(x+3) = 0$ or $(x-7) = 0$

$x = -3$ $x = 7$

Solve by Factoring:

1. $3x^2 - 20x - 7 = 0$

$-21x + x = -20x$

$(3x + 1)(x - 7) = 0$

$3x + 1 = 0 \quad x - 7 = 0$

$3x = -1$

$x = -\frac{1}{3}$; $x = 7$

2. $4x^2 - 25 = 0$

$(2x - 5)(2x + 5) = 0$

$2x - 5 = 0 \quad 2x + 5 = 0$

$2x = 5 \quad 2x = -5$

$x = \frac{5}{2}$, $x = \frac{-5}{2}$

Solve by Finding Square Roots

* when you have just an x^2 you may solve for x^2

$$9x^2 - 144 = 0$$

$$\frac{9x^2}{9} = \frac{144}{9}$$

$$\sqrt{x^2} = \pm\sqrt{16}$$

$$x = \pm 4$$

$$x = 4, \; x = -4$$

4. Solve each equation by factoring. Check your answers.

a) $x^2 + 7x = 18$

$x^2 + 7x - 18 = 0$

$-2x + 9x = 7x$

$(x + 9)(x - 2) = 0$

$x+9=0 \quad x-2=0$

$x=-9 \; ; x=2$

b) $2x^2 = -4x + 6$

$+4x \quad -6$

$2x^2 + 4x - 6 = 0$

$2(x^2 + 2x - 3) = 0$

$-x + 3x = 2x$

$2(x+3)(x-1)=0$

~~$2=0$~~ $x+3=0 \quad x-1=0$

$x=-3 \; ; x=1$

4. Solve each equation by factoring. Check your answers.

c. $16x^2 = 8x$

$16x^2 - 8x = 0$

$8x(2x - 1) = 0$

$8x = 0 \quad 2x - 1 = 0$

$2x = 1$

$x = 0 \; ; x = \frac{1}{2}$

5. Solve each equation by finding square roots.

a) $6x^2 - 486 = 0$

$\frac{6x^2}{6} = \frac{486}{6}$

$\sqrt{x^2} = \pm\sqrt{81}$

$x = \pm 9$

$x = 9, x = -9$

b) $\frac{3x^2}{3} = \frac{24}{3}$

$\sqrt{x^2} = \pm\sqrt{8}$

$x = \pm\sqrt{4 \cdot 2}$

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

$x = 2\sqrt{2}$; $x = -2\sqrt{2}$

5. Solve each equation by finding square roots.

c) $x^2 - \frac{1}{4} = 0$

$\sqrt{x^2} = \pm\sqrt{\frac{1}{4}}$

$x = \pm\frac{1}{2}$

$x = \frac{1}{2}, x = -\frac{1}{2}$

Solve each equation:

a) $4x^2 - 17x - 15 = 0$

$3x - 20x = -17x$

$(x-5)(4x+3) = 0$

$x-5=0 \quad 4x+3=0$

$x=5 \; ; \; x=-3/4$

b) $10x^2 + 19x + 6 = 0$

$15x + 4x = 19x$

$(5x+2)(2x+3) = 0$

$5x+2=0 \quad 2x+3=0$

$x=-2/5 \; , \; x=-3/2$

Solve each equation:

c) $3x^2 - 4800 = 0$

$+4800 \quad +4800$

$\frac{3x^2}{3} = \frac{4800}{3}$

$\sqrt{x^2} = \pm\sqrt{1600}$

$x = \pm 40$

The graphs of each pair of functions intersect. Find their points of intersection without using a calculator. (Hint: Solve as a system using substitution.)

$y = x^2$

$y = -\frac{1}{2}x^2 + \frac{3}{2}x + 3$

$x = 2 \quad y = (2)^2$

$x = -1 \quad y = (-1)^2$

$(2, 4) \quad (-1, 1)$

$2(x^2) = 2\left(-\frac{1}{2}x^2 + \frac{3}{2}x + 3\right)$

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

$+x^2 - 3x - 6 \quad +x^2 - 3x - 6$

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

$3(x^2 - x - 2) = 0$

$3(x-2)(x+1) = 0$

$3 = 0 \quad x - 2 = 0 \quad x + 1 = 0$

$x = 2 \; ; \; x = -1$

Assignment:

Day 1: pgs 270-272 1-19 odds, 33, 35, 54-56