Today's Plan:

Learning Target (standard): I will solve quadratic equations by completing the square and the quadratic formula.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Solve by completing the square.

$$x^2 - 3x - 10 = 0$$

$\left(\frac{3}{2}\right)^2 = \frac{9}{4}$

$x^2 - 3x + \frac{9}{4} = 10 + \frac{9}{4}$

$\left(x - \frac{3}{2}\right)^2 = \pm\sqrt{\frac{49}{4}}$

$x - \frac{3}{2} = \frac{7}{2}, -\frac{7}{2}$

$x = 5, -2$

Solve by completing the square.

$4w^2 - 4w - 1 = 0$

$\left(\frac{1}{2}\right)^2 = \frac{1}{4}$

$\frac{4w^2}{4} - \frac{4w}{4} = \frac{1}{4}$

$w^2 - 1w + \frac{1}{4} = \frac{1}{4} + \frac{1}{4}$

$\sqrt{\left(w - \frac{1}{2}\right)^2} = \pm\sqrt{\frac{2}{4}}$

$w - \frac{1}{2} = \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}$

$w = \frac{1}{2} + \frac{\sqrt{2}}{2}, \frac{1}{2} - \frac{\sqrt{2}}{2}$

$w = \frac{1+\sqrt{2}}{2}, \frac{1-\sqrt{2}}{2}$

Solve by completing the square.

$2x^2 + 6x + 5 = 0$

$\left(\frac{3}{2}\right)^2 = \frac{9}{4}$

$\frac{2x^2}{2} + \frac{6x}{2} = -\frac{5}{2}$

$x^2 + 3x + \frac{9}{4} = -\frac{5}{2} + \frac{9}{4}$

$\sqrt{\left(x + \frac{3}{2}\right)^2} = \pm\sqrt{-\frac{1}{4}}$

$x + \frac{3}{2} = \frac{1}{2}i, -\frac{1}{2}i$

$x = -\frac{3}{2} + \frac{1}{2}i, -\frac{3}{2} - \frac{1}{2}i$

Solutions to a Quadratic Equation: $ax^2+bx+c=0$

- the discriminant of a quadratic equation is used to tell what kind of solutions it will have and how many

$b^2 - 4ac$ is the discriminant

- if $b^2 - 4ac < 0$ the equation has 2 complex solutions (i)
- if $b^2 - 4ac = 0$ the equation has 1 real solution
- if $b^2 - 4ac > 0$ the equation has 2 real solutions

$3y^2 + y + 1 = 0$

$a=3$
$b=1$
$c=1$

b^2-4ac

$(1)^2-4(3)(1)$

$1-12$

$-11<0$ 2 complex solutions

Use the discriminant to determine the number of solutions and type.

$2p^2 + 5p + 1 = 0$

$a=2$
$b=5$
$c=1$

b^2-4ac

$(5)^2-4(2)(1)$

$25-8$

$17>0$ 2 real solutions

Quadratic Formula:

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ discriminant

Solve using the quadratic formula:

$x^2 - 3x - 10 = 0$

$a=1$
$b=-3$
$c=-10$

b^2-4ac

$(-3)^2-4(1)(-10)$

$9+40$

$49>0$ 2 real solutions

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

$x=5,-2$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{3\pm\sqrt{49}}{2(1)}$

$=\frac{3\pm7}{2}$

$x=\frac{3+7}{2}, \frac{3-7}{2}$

$x=5,-2$

Solve using the quadratic formula:

$4w^2 - 4w - 1 = 0$

$a=4$
$b=-4$
$c=-1$

b^2-4ac

$(-4)^2-4(4)(-1)$

$16+16$

$32>0$ 2 real solutions

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{4\pm\sqrt{32}}{2(4)}$

$\div 4$

$=\frac{4\pm4\sqrt{2}}{8}$

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

Assignment:

p.333 #64-116 (by 4)