COLLEGE ALGEBRA

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GPS # 13 **2.2 SOLVING QUADRATIC EQUATIONS** Class Time: 11:30 A.M Date: 1/5/08

Useful Guidelines:

* Quadratic Equation: $f(x) = ax^2 + bx + c = 0 (a \neq 0)$, where a, b and c are real numbers.
* Square Root Property: If x and k are complex numbers and $x^2 = k$, then $x = \sqrt{k}$ or $x = -\sqrt{k}$.
* Completing the Square: To solve $ax^2 + bx + c = 0 (a \neq 0)$:

Step 1: If $a \neq 1$, divide each side by a.
Step 2: Write the equation with the variable terms on one side and the constant on the other.
Step 3: Take half the coefficient of x and square it.
Step 4: Add the square to both sides of the equation.
Step 5: Factor the perfect square of a trinomial, write it as the square of a binomial, and simplify.
Step 6: Use the square root property to complete the solution and write down the solution set.

20/20 Good job!

Use the square root property to solve each equation and give the solution set.

1. a) $x^2 = 49$

$\sqrt{x^2} = \sqrt{49}$

$x = \pm 7$

sol set: $\{7, -7\}$

b) $x^2 - 8 = 0$

$+8 \quad +8$

$x^2 = 8$

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

$x = \pm \sqrt{8}$

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

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

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

c) $\sqrt{(x-4)^2} = \sqrt{25}$

$x - 4 = \pm 5$

$x = 4 \pm 5$

$\{9, -1\}$

d) $\sqrt{(2x-5)^2} = \sqrt{12}$

$2x - 5 = \pm \sqrt{4 \cdot 3}$

$2x - 5 = \pm 3\sqrt{2}$

$+5$

$\frac{2x}{2} = \frac{5 \pm 3\sqrt{2}}{2}$

$x = \frac{5}{2} \pm \frac{3\sqrt{2}}{2}$

sol set: $\{x \mid x = \frac{5}{2} \pm \frac{3\sqrt{2}}{2}\}$

Solve each equation by completing the square and give the solution set.

2. a) $2x^2 + 8x + 2 = 0$

$\frac{2}{2} \quad \frac{8}{2} \quad \frac{2}{2}$

$x^2 + 4x + 1 = 0$

$-1 \quad -1$

$x^2 + 4x + 4 = -1 + 4$

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

$(x+2)^2 = 3$

$\sqrt{(x+2)^2} = \sqrt{3}$

$x + 2 = \pm \sqrt{3}$

$-2 \quad -2$

sol set: $\{x \mid x = -2 \pm \sqrt{3}\}$

b) $z^2 - 10z + 15 = 0$

$-15 \quad -15$

$z^2 - 10z + 25 = 0 - 15 + 25$

$z^2 - 10z + 25 = 10$

$(z-5)(z-5) = 10$

$\sqrt{(z-5)^2} = \sqrt{10}$

$z - 5 = \pm \sqrt{10}$

$+5 \quad +5$

$z = 5 \pm \sqrt{10}$

sol set: $\{z \mid z = 5 \pm \sqrt{10}\}$

v. neat!