COLLEGE ALGEBRA

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GPS # 14 **2.2 SOLVING QUADRATIC EQUATIONS II**

Class Time: 11:30-12:45 Date: 2-5-08

Useful Guidelines:

The solutions of $ax^2+bx+c=0 (a \neq 0)$ are given by $x=\frac{-b \pm \sqrt{b^2-4ac}}{2a}$. "Quadratic Formula"

If a, b, and c are integers, then the number and type of solutions can be predicted as follows:

* If the discriminant $b^2-4ac>0$, then we'll have two real solutions.
* If the discriminant $b^2-4ac=0$, then we'll have only one real solution.
* If the discriminant $b^2-4ac<0$, then we'll have two complex solutions.

2/2 Good Job!

1. Solve each equation using the quadratic formula and give the solution set.

a) $x^2-x-12=0$

$a=1$
$b=-1$
$c=12$

$\frac{-(-1) \pm \sqrt{(-1)^2-4(1)(-12)}}{2(1)} = \frac{1 \pm \sqrt{1+48}}{2} = \frac{1 \pm \sqrt{49}}{2} = \frac{1 \pm 7}{2}$

$= \frac{1 \pm 7}{2} =$ solution set: $(4, -3)$ or $\{x \mid x = 4, -3\}$

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

$a=2$
$b=-3$
$c=3$

$\frac{-(-3) \pm \sqrt{(-3)^2-4(2)(3)}}{2(2)}$

$= \frac{3 \pm \sqrt{9-24}}{4} = 3 \pm \sqrt{-15}$

$= \frac{3 \pm i\sqrt{15}}{4}$

solution set:
$\{x \mid x = \frac{3+i\sqrt{15}}{4}, x = \frac{3-i\sqrt{15}}{4}\}$

2. Use the discriminant to predict whether the solutions to each equation are A. *one real solution*; B. *two real solutions*; C. *two complex solutions*.

a) $x^2+5x+4=0$

$(5)^2-4(1)(4)$
$25-16=9$
$9>0$, so
B. Two real solutions

b) $2x^2-4x+2=0$

$(-4)^2-4(2)(2)$
$16-16=0$
$0=0$, so
A. one real solution.

c) $5x^2-3x+7=0$

$(-3)^2-4(5)(7)$
$9-140=-131$
$-131<0$ so,
C. Two complex solutions

d) $x^2+3x-1=0$

$(3)^2-4(1)(-1)$
$9+4=13$
$13>0$ so,
B. Two real solutions.

3. If a ball is thrown upward at 32 feet per second from a height of 6 feet, the height of the ball can be modeled by $S(t)=6+32t-8t^2$ feet, where t is the number of seconds after the ball is thrown. How long after the ball is thrown is the height 36 feet?

$S(t)=6+32t-8t^2$
$36=6+32t-8t^2$
$8t^2-32t+30=0$
$2(4t^2-16t+15)=0$
$4t^2-16t+15=0$

$a=4$
$b=-16$
$c=15$

vertex $=16$

$4^2>0 =$ Two real solutions

$(2t-3)(2t-5)=0$

Solution set:
$\{(3/2, 5/2)\}$