3.3 - Complex Quadratic Roots - Day 3

Writing Quadratic Equations Given the Solutions (Roots)

1. Set each solution equal to x.
2. Get each equation equal to zero.
3. Write as a product of two factors equal to zero.
4. Distribute to get the quadratic equation in standard form.

Ex1.) Given the solutions (roots) of a quadratic equation, write the quadratic equation in standard form.

-5 and $\frac{3}{4}$

$x = -5$ $\quad 4 \cdot x = \frac{3}{4} \cdot 4$

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

✓ $\quad$ ✓ $4x - 3 = 0$

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

$4x^2 - 3x + 20x - 15 = 0$

$\boxed{4x^2 + 17x - 15 = 0}$

Ex2.) Given the solutions (roots) of a quadratic equation, write the quadratic equation in standard form.

$-5i\sqrt{3}$ and $5i\sqrt{3}$

$x = -5i\sqrt{3}$ $\quad x = 5i\sqrt{3}$

$x + 5i\sqrt{3} = 0$ $\quad x - 5i\sqrt{3} = 0$

$(x + 5i\sqrt{3})(x - 5i\sqrt{3}) = 0$

$x^2 - 5i\sqrt{3}x + 5i\sqrt{3}x + 75 = 0$

$\boxed{x^2 + 75 = 0}$

The method we used on the previous two will not work well on the next ones because the solutions are written in the irrational/complex answer form as the result of using the quadratic formula.

Ex3.) Given the solutions (roots) of a quadratic equation, write the quadratic equation in standard form.

$\frac{-9 \pm i\sqrt{79}}{10}$

$-b = -9$, $b = 9$

$2a = 10$, $a = 5$

$b^2 - 4ac = -79$

$(9)^2 - 4(5)c = -79$

$81 - 20c = -79$

$-20c = -160$

$c = 8$

*Remember...
Given a quadratic equation in standard form, $ax^2 + bx + c = 0$,

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

$5x^2 + 9x + 8 = 0$

Ex4.) Given the solutions (roots) of a quadratic equation, write the quadratic equation in standard form.

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

$2a = 2$, $a = 1$

$-b = 5$, $b = -5$

$b^2 - 4ac = 3$

$(-5)^2 - 4(1)c = 3$

$25 - 4c = 3$

$-4c = -22$

$c = \frac{-22}{-4}$

$c = \frac{11}{2}$

*Remember...
Given a quadratic equation in standard form, $ax^2 + bx + c = 0$,

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

$2\left(1x^2 - 5x + \frac{11}{2} = 0\right)$

$2x^2 - 10x + 11 = 0$

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Answers to HW 3.2 Day 3 - Writing Quadratic Equations

- Questions on any ??? -

1.) $x^2 - 2x - 15 = 0$

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

3.) $2x^2 - 17x + 21 = 0$

4.) $x^2 + 36 = 0$

5.) $x^2 - 10 = 0$

6.) $x^2 + 24 = 0$

7.) $x^2 - 9x - 24 = 0$

8.) $8x^2 + 3x + 1 = 0$

9.) $12x^2 - 6x - 13 = 0$

10.) $x^2 + 3x + 9 = 0$