EVEN ANSWERS

DAY 6: SOLVING QUADRATICS WITH IMAGINARY SOLUTIONS

Solve each of the following quadratic equations. Express your solutions in simplest a + bi form. Check.

1. $x^2 + 4x + 20 = 12x - 5$

No solution

2. $x^2 = x - 1$

No solution

all imaginary in radicals

3. $2x^2 - 25x + 27 = -15x - 10$

No solution

4. $8x^2 + 36x + 24 = 12x + 5$

No solution

5. $x^2 + 6x + 15 = 8x - 2$

No solution

6. $4x^2 + 38x + 50 = 10x - 35$

No solution

Solve the following quadratics.

1. $25x^2 - 8 = -7$

$x = \sqrt{1/25}$

$x = -\sqrt{1/25}$

2. $x^2 + 4x + 5 = 0$

$x = -2 + i$

$x = -2 - i$

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

$x = \frac{3 + i\sqrt{31}}{2}$

$x = \frac{3 - i\sqrt{31}}{2}$

4. $2x^2 - 6x + 5 = 0$

$x = \frac{3 - i}{2}$

$x = \frac{3 + i}{2}$

Day 6 Work

① $x^2+4x+20 = 12x-5$

$-12x+5 \quad -12x+5$

$x^2-8x+25=0 \qquad a=1 \quad b=-5 \quad c=25$

$x = \frac{8 \pm \sqrt{25-100}}{2} = \frac{8 \pm \sqrt{-75}}{2}$

75

8 15

8 3

$= \frac{8 \pm 5i\sqrt{3}}{2}$

$x = \frac{8+5i\sqrt{3}}{2}$ or $x \quad \frac{8-5i\sqrt{3}}{2}$

② $x^2 = x-1$

$-x+1$

$x^2-x+1=0 \qquad a=1 \quad b=-1 \quad c=1$

$x = \frac{1 \pm \sqrt{-3}}{2} = \frac{1 \pm i\sqrt{3}}{2}$

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

③ $2x^2 - 25x + 27 = -15x - 10$
$+15x \quad +10 \qquad +15x + 10$

$2x^2 - 10x + 37 = 0 \qquad a = 2 \quad b = -10 \quad c = 37$

$$x = \frac{10 \pm \sqrt{100 - 296}}{4} = \frac{10 \pm \sqrt{-196}}{4}$$

$$= \frac{10 \pm 14i}{4} = \frac{5 \pm 7i}{2}$$

$$\boxed{x = \frac{5 - 7i}{2} \quad \text{or} \quad x = \frac{5 + 7i}{2}}$$

④ $8x^2 + 36x + 24 = 12x + 5$
$-12x \quad -5 \qquad -12x - 5$

$8x^2 + 24x + 19 = 0 \qquad a = 8 \quad b = 24 \quad c = 19$

$$x = \frac{-24 \pm \sqrt{576 - 608}}{16} = \frac{-24 \pm \sqrt{-32}}{16}$$

$$= \frac{-24 \pm 4i\sqrt{2}}{16} = \frac{-6 \pm i\sqrt{2}}{4}$$

$$\boxed{x = \frac{-6 + i\sqrt{2}}{4} \quad \text{or} \quad x = \frac{-6 - i\sqrt{2}}{4}}$$

(5) $x^2 + 6x + 15 = 8x - 2$

$-8x \quad +2 \quad -8x + 2$

$x^2 - 2x + 17 = 0 \qquad a = 1 \quad b = -2 \quad c = 17$

$x = \frac{2 \pm \sqrt{4 - 68}}{2} = \frac{2 \pm 8i}{2} = 1 \pm 4i$

$\boxed{x = 1 + 4i \quad \text{or} \quad x = 1 - 4i}$

(6) $4x^2 + 38x + 50 = 10x - 35$

$-10x \quad +35 \quad -10x + 35$

$4x^2 + 28x + 85 = 0 \qquad a = 4 \quad b = 28 \quad c = 85$

$x = \frac{-28 \pm \sqrt{784 - 1360}}{8} = \frac{-28 \pm \sqrt{-576}}{8}$

$= \frac{-28 \pm 24i}{8} = \frac{7 \pm 6i}{4}$

$\boxed{x = \frac{7 + 6i}{4} \quad \text{or} \quad x = \frac{7 - 6i}{4}}$