The Weekly Rigor

14 Problems in Using the Quadratic Formula
(Part 1)

PROBLEMS

Use the Quadratic Formula to solve for x. Reduce all radical expressions to lowest factors (for example, $2\sqrt{3}$ instead of $\sqrt{12}$).

1. $x^2 - 5x - 24 = 0$

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

3. $4x^2 + 11x - 20 = 0$

4. $x^2 + 14x + 44 = 0$

5. $x^2 - 3x - 3 = 0$

6. $x^2 + 8x - 4 = 0$

7. $12x - 9x^2 = -3$

8. $9x^2 + 24x + 16 = 0$

9. $4x^2 + 4x = 7$

10. $28x - 49x^2 = 4$

11. $2x^2 = 4 - x$

12. $12x^2 + 32x = -5$

13. $2x^2 = x + 5$

14. $-6x^2 + 12x = -1$

1. $x = 8, x = -3$	2. $x = 2, x = -5$
3. $x = \frac{5}{4}, x = -4$	4. $x = -7 \pm \sqrt{5}$
5. $x = \frac{3}{2} \pm \frac{\sqrt{21}}{2}$	6. $x = -4 \pm 2\sqrt{5}$
7. $x = \frac{2}{3} \pm \frac{\sqrt{7}}{3}$	8. $x = -\frac{4}{3}$
9. $x = -\frac{1}{2} \pm \sqrt{2}$	10. $x = \frac{2}{7}$
11. $x = -\frac{1}{4} \pm \frac{\sqrt{33}}{4}$	12. $x = -\frac{1}{6}, x = -\frac{5}{2}$
13. $x = \frac{1}{4} \pm \frac{\sqrt{41}}{4}$	14. $x = 1 \pm \frac{\sqrt{42}}{6}$

SELECTED SOLUTIONS

3. Using the Quadratic Formula

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

with $a = 4$, $b = 11$, and $c = -20$, we have by substitution

$$x = \frac{-11 \pm \sqrt{11^2 - 4(4)(-20)}}{2(4)} = \frac{-11 \pm \sqrt{121 + 320}}{8} = \frac{-11 \pm \sqrt{441}}{8} = \frac{-11 \pm 21}{8} =$$

$$= \frac{-11 + 21}{8}, \frac{-11 - 21}{8} = \frac{10}{8}, \frac{-32}{8} = \frac{5}{4}, -4$$

5. Using the Quadratic Formula

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

with $a = 1$, $b = -3$, and $c = -3$, we have by substitution

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-3)}}{2(1)} = \frac{3 \pm \sqrt{9 + 12}}{2} = \frac{3 \pm \sqrt{21}}{2} = \frac{3}{2} \pm \frac{\sqrt{21}}{2}$$