Solving Quadratic Equations by Factoring and the Quadratic Formula

Original tasks 1, 2, 3, 4 / complete keys

Task 1

Solve x^2 - 7x + 10 = 0 by factoring.

Answer: x = 5 or x = 2.

Reason: Find two numbers that multiply to 10 and add to -7: -5 and -2. Factor as (x - 5)(x - 2) = 0. Set each factor to zero: x - 5 = 0 gives x = 5; x - 2 = 0 gives x = 2.

Check: Substitute x = 5: 25 - 35 + 10 = 0. Substitute x = 2: 4 - 14 + 10 = 0. Both checks pass.

Task 2

Solve 2x^2 + 5x - 3 = 0 using the quadratic formula.

Answer: x = 0.5 or x = -3.

Reason: Here a = 2, b = 5, c = -3. Discriminant = 5^2 - 4(2)(-3) = 25 + 24 = 49. Then x = [-5 ± sqrt(49)] / (2*2) = (-5 ± 7)/4. This gives x = 2/4 = 0.5 and x = -12/4 = -3.

Check: Substitute x = 0.5: 2(0.25) + 2.5 - 3 = 0.5 + 2.5 - 3 = 0. Substitute x = -3: 2(9) - 15 - 3 = 18 - 18 = 0. Both checks pass.

Task 3

Solve x^2 + 6x + 9 = 0 by factoring.

Answer: x = -3 (repeated real solution).

Reason: The expression factors as (x + 3)(x + 3) = 0, so x + 3 = 0 gives x = -3. Since the factor repeats, there is one repeated real solution.

Check: Substitute x = -3: 9 - 18 + 9 = 0. The check passes.

Task 4

Solve 3x^2 - 4x + 1 = 0 using the quadratic formula.

Answer: x = 1 or x = 1/3.

Reason: Here a = 3, b = -4, c = 1. Discriminant = (-4)^2 - 4(3)(1) = 16 - 12 = 4. Then x = [4 ± sqrt(4)] / (2*3) = (4 ± 2)/6. This gives x = 6/6 = 1 and x = 2/6 = 1/3.

Check: Substitute x = 1: 3 - 4 + 1 = 0. Substitute x = 1/3: 3(1/9) - 4(1/3) + 1 = 1/3 - 4/3 + 1 = -1 + 1 = 0. Both checks pass.

Solving Quadratic Equations by Factoring and the Quadratic Formula

Source rubric / reflection

- [ ] Equation is written in standard form before solving.
- [ ] Method chosen is appropriate and clearly stated.
- [ ] Factoring steps or formula substitution are shown completely.
- [ ] All real solutions are found and simplified.
- [ ] Each solution is checked by substitution.
- [ ] Handwriting follows the stated convention: equation on one line, steps below, final answers boxed; legible alternative layouts are accepted.

Reflection: What did you check, what did you change, and what will you try next?