

Unit 7 Lesson 13: Completing the Square (Part 2)

1 Math Talk: Equations with Fractions (Warm up)

Student Task Statement

Solve each equation mentally.

$$x + x = \frac{1}{4}$$

$$\left(\frac{3}{2}\right)^2 = x$$

$$\frac{3}{5} + x = \frac{9}{5}$$

$$\frac{1}{12} + x = \frac{1}{4}$$

2 Solving Some Harder Equations

Student Task Statement

Solve these equations by completing the square.

1. $(x - 3)(x + 1) = 5$

2. $x^2 + \frac{1}{2}x = \frac{3}{16}$

3. $x^2 + 3x + \frac{8}{4} = 0$

4. $(7 - x)(3 - x) + 3 = 0$

5. $x^2 + 1.6x + 0.63 = 0$

3 Spot Those Errors!

Student Task Statement

Here are four equations, followed by worked solutions of the equations. Each solution has at least one error.

- Solve one or more of these equations by completing the square.
- Then, look at the worked solution of the same equation as the one you solved. Find and describe the error or errors in the worked solution.

1. $x^2 + 14x = -24$

2. $x^2 - 10x + 16 = 0$

3. $x^2 + 2.4x = -0.8$

4. $x^2 - \frac{6}{5}x + \frac{1}{5} = 0$

Worked solutions (with errors):

1.

$$\begin{aligned}x^2 + 14x &= -24 \\x^2 + 14x + 28 &= 4 \\(x + 7)^2 &= 4\end{aligned}$$

$$\begin{aligned}x + 7 &= 2 \quad \text{or} \quad x + 7 = -2 \\x &= -5 \quad \text{or} \quad x = -9\end{aligned}$$

2.

$$\begin{aligned}x^2 - 10x + 16 &= 0 \\x^2 - 10x + 25 &= 9 \\(x - 5)^2 &= 9\end{aligned}$$

$$\begin{aligned}x - 5 &= 9 \quad \text{or} \quad x - 5 = -9 \\x &= 14 \quad \text{or} \quad x = -4\end{aligned}$$

3.

$$\begin{aligned}x^2 + 2.4x &= -0.8 \\x^2 + 2.4x + 1.44 &= 0.64 \\(x + 1.2)^2 &= 0.64 \\x + 1.2 &= 0.8 \\x &= -0.4\end{aligned}$$

4.

$$\begin{aligned}x^2 - \frac{6}{5}x + \frac{1}{5} &= 0 \\x^2 - \frac{6}{5}x + \frac{9}{25} &= \frac{9}{25} \\ \left(x - \frac{3}{5}\right)^2 &= \frac{9}{25}\end{aligned}$$

$$\begin{aligned}x - \frac{3}{5} &= \frac{3}{5} \quad \text{or} \quad x - \frac{3}{5} = -\frac{3}{5} \\x &= \frac{6}{5} \quad \text{or} \quad x = 0\end{aligned}$$