

Debate: Which of these methods for solving $x^2 - 10x - 4 = 20$ is the best? Take turns going around the group. Each person states which method you think is best and why (no comments.) Then go around a second time (you may revise your original) and questions are welcome. Be ready to share with the class.

Method 1: $x^2 - 10x - 4 = 20$

$$\begin{aligned}
 x^2 - 10x - 4 &= 20 \\
 x^2 - 10x - 4 + 29 &= 20 + 29 & \frac{-10}{2} = -5 & (-5)^2 = 25 \\
 x^2 - 10x + 25 &= 49 \\
 (x-5)(x-5) &= 49 \\
 (x-5)^2 &= 49 \\
 \sqrt{(x-5)^2} &= \sqrt{49} \\
 |x-5| &= 7 \\
 x-5 &= 7 & x-5 &= -7 \\
 x &= 12 & x &= -2
 \end{aligned}$$

Method 2: $x^2 - 10x - 4 = 20$

$$\begin{aligned}
 x^2 - 10x - 4 &= 20 \\
 -20 &-20 \\
 x^2 - 10x - 24 &= 0 \\
 (x+2)(x-12) &= 0 \\
 x+2 &= 0 & x-12 &= 0 \\
 -2 &-2 & +12 & +12 \\
 x &= -2 & x &= 12
 \end{aligned}$$

Diagram showing the factoring process for $x^2 - 10x - 24$:

$$\begin{array}{r}
 \begin{array}{r}
 -24 \\
 \times 2 \\
 \hline
 -48
 \end{array} \\
 \begin{array}{r}
 -12 \\
 \times 2 \\
 \hline
 -24
 \end{array} \\
 \hline
 \begin{array}{r}
 -12 \\
 \times 2 \\
 \hline
 -24
 \end{array}
 \end{array}$$

Diagram showing the factoring process for $x^2 - 10x - 24$ using a box method:

$$\begin{array}{c}
 -12 \quad \begin{array}{|c|c|} \hline -12 & -24 \\ \hline \end{array} \\
 \times \quad \begin{array}{|c|c|} \hline x^2 & 2x \\ \hline \end{array} \\
 \hline
 x + 2
 \end{array}$$

Method 3: $x^2 - 10x - 4 = 20$

$$\begin{aligned}
 x^2 - 10x - 20 &= 4 \\
 x^2 - 10x - 24 &= 0 \\
 x &= \frac{+10 \pm \sqrt{10^2 - 4(-24)}}{2} \\
 x &= \frac{10 \pm \sqrt{100 + 96}}{2} \\
 x &= \frac{10 \pm \sqrt{196}}{2} \\
 x &= \frac{10 \pm 14}{2}
 \end{aligned}$$

Method 4: $x^2 - 10x - 4 = 20$

$x = -2, x = 12$



