Simplifying in our Quadratic Formula

1) $x = \dfrac{-2 \pm \sqrt{12}}{2}$

$12 = 4 \cdot 3 = 2 \cdot 2 \cdot 3$, $\sqrt{12} = 2\sqrt{3}$ or $\sqrt{4} \cdot \sqrt{3} = 2\sqrt{3}$

$= \dfrac{2 \pm 2\sqrt{3}}{2}$

$\boxed{x = -1 \pm \sqrt{3}}$

2) $x = \dfrac{8 \pm \sqrt{24}}{2}$

$\sqrt{24} = \sqrt{4}\sqrt{6} = 2\sqrt{6}$

$x = \dfrac{8 \pm 2\sqrt{6}}{2}$

$x = 4 \pm \sqrt{6}$

3) $x = \dfrac{-6 \pm \sqrt{288}}{12}$

$\sqrt{288} = \sqrt{144} \cdot \sqrt{2} = 12\sqrt{2}$

$x = \dfrac{-6 \pm 12\sqrt{2}}{12}$

$x = \dfrac{-1 \pm 2\sqrt{2}}{2}$

Further Examples of Quadratic Equations

1) $\frac{x+3}{2x-1} = \frac{2x+3}{x+5}$

cross multiply

$(x+3)(x+5) = (2x-1)(2x+3)$

$x^2+5x+3x+15 = 4x^2+6x-2x-3$

$x^2+8x+15 = 4x^2+4x-3$

$0 = 3x^2-4x-18$

$x = \frac{2 \pm \sqrt{58}}{3}$

Extra Practice Find the EXACT roots.

1. $x^2 - 2x - 2 = 0$
2. $2x^2 = 8x - 5$
3. $6x^2 - 8x = 0$
4. $x^2 - 2\sqrt{2}x + 2 = 0$
5. $\frac{1-x}{3x} = \frac{2x}{5}$

Answers

1. $1 \pm \sqrt{3}$
2. $\frac{4 \pm \sqrt{6}}{2}$
3. $0, \frac{4}{3}$
4. $\sqrt{2}$
5. $\frac{-5 \pm \sqrt{145}}{12}$