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$$12(x+1) - 5(x+2) = 30$$

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$$12x + 12 - 5x - 10 = 12(x+1) - 5(x+2) = 30$$

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Which we can do by Subtracting 2 to get: $7x = 28$

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And Dividing by 7 to get: $x = 4$

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Conclusion: The solution to $\frac{12}{x+2} + \frac{-5}{x+1} = \frac{30}{x^2+3x+2}$ is: $x = 4$