Adding Rationals - Example 1

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We simply add the numerators, over the common denominator.

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

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We can get a common denominator by getting the same factors in both

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We can get a common denominator by getting the same factors in both

So we multiply the first Rational by $\frac{x+2}{x+2} = 1$ and the second by $\frac{x+1}{x+1} = 1$

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$$\frac{2}{x+1} + \frac{3}{x+2} = \frac{x+2}{x+2} \cdot \frac{2}{x+1} + \frac{3}{x+2} \cdot \frac{x+1}{x+1}$$

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With a common denominator $(x+1)(x+2)$ we can add

$$\frac{2}{x+1} + \frac{3}{x+2} = \frac{x+2}{x+2} \cdot \frac{2}{x+1} + \frac{3}{x+2} \cdot \frac{x+1}{x+1}$$

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$$= \frac{(x+2) \cdot 2 + 3 \cdot (x+1)}{(x+1)(x+2)}$$

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We can clean up the top by distributing

$$\frac{2}{x+1} + \frac{3}{x+2} = \frac{x+2}{x+2} \cdot \frac{2}{x+1} + \frac{3}{x+2} \cdot \frac{x+1}{x+1}$$

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Note: Factored form is useful, so we will leave the denominator as is