

1. Add the following fractions.

$$\begin{aligned} \text{a) } \frac{1}{2} + \frac{2}{3} \quad \text{LCD} = 2 \cdot 3 = 6 \\ = \frac{3}{6} + \frac{4}{6} \\ = \frac{3+4}{6} \\ = \frac{7}{6} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{x^2}{y} + \frac{1}{xy} \quad \text{LCD} = xy \\ = \frac{x^2}{xy} + \frac{1}{xy} \\ = \frac{x^2+1}{xy} \end{aligned}$$

The same method can be applied when adding fractions involving trigonometric functions.

$$\begin{aligned} \frac{\sin \theta}{\cos \theta} + \frac{1}{\sin \theta} \quad \text{LCD} = \cos \theta \sin \theta \\ = \frac{\sin \theta (\sin \theta)}{\cos \theta (\sin \theta)} + \frac{1 (\cos \theta)}{\sin \theta (\cos \theta)} \\ = \frac{\sin^2 \theta + \cos \theta}{\sin \theta \cos \theta} \end{aligned}$$

Complex fractions can be simplified in a similar way by multiplying the numerator and denominator by the common denominator.

2. Simplify.

$$\begin{aligned} \text{a) } \frac{\left(\frac{2}{5} + 3\right)}{\left(\frac{1}{2} + \frac{1}{5}\right)} \quad \text{LCD} = 10 \\ = \frac{\frac{20}{5} + 30}{\frac{10}{2} + \frac{10}{5}} \\ = \frac{4 + 30}{5 + 2} \\ = \frac{34}{7} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{\left(\frac{\sin \theta}{\cos \theta} + 1\right)}{\left(\frac{1}{\cos \theta} + \sin \theta\right)} \quad \text{LCD} = \cos \theta \\ = \frac{\frac{\sin \theta \cos \theta}{\cos \theta} + \cos \theta}{\frac{\cos \theta}{\cos \theta} + \sin \theta \cos \theta} \\ = \frac{\sin \theta + \cos \theta}{1 + \sin \theta \cos \theta} \end{aligned}$$