

1. Add the following fractions.

$$a) \frac{31}{32} + \frac{24}{32}$$

$$\frac{31+24}{64}$$

$$= \frac{55}{64}$$

$$b) \frac{x^2}{xy} + \frac{1}{xy}$$

$$\frac{x^2+1}{xy}$$

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

$$\frac{\sin \theta}{\cos \theta} + \frac{1}{\sin \theta} \cos \theta$$

$$\frac{\sin^2 \theta + \cos^2 \theta}{\sin \theta \cos \theta}$$

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

2. Simplify.

$$a) \left(\frac{\frac{2}{5} + 3}{\frac{1}{2} + \frac{1}{5}} \right) \frac{10}{1}$$

$$= \frac{(4+30)}{(5+2)}$$

$$= \frac{34}{7}$$

$$b) \left(\frac{\frac{\sin \theta}{\cos \theta} + 1}{\frac{1}{\cos \theta} + \sin \theta} \right) \frac{\cos \theta}{\cos \theta}$$

$$\frac{\sin \theta + \cos \theta}{1 + \sin \theta \cos \theta}$$

You may need to factor before simplifying.

3. Simplify.

a) $\frac{4a}{3a-4b} + \frac{8}{4b-3a}$

$$\frac{4a}{3a-4b} + \frac{8}{-(3a-4b)}$$

$$\frac{4a - 8}{3a-4b}$$

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$$\frac{4a}{3a-4b} + \frac{(-1)8}{(-1)(4b-3a)}$$

$$\frac{4a - 8}{3a-4b}$$

c) $\frac{15xy-30y^2}{25x^2-50xy}$

$$\frac{3 \cdot 5y(x-2y)}{5 \cdot 5x(x-2y)}$$

$$\frac{3y}{5x}$$

b) $\frac{1+\sin x}{1-\sin x} + \frac{1+\csc x}{1-\csc x}$

$$\frac{1+\sin x}{1-\sin x} + \left[\frac{1+\frac{1}{\sin x}}{1-\frac{1}{\sin x}} \right] \begin{matrix} \sin \\ \sin \end{matrix}$$

$$\frac{1+\sin x}{1-\sin x} + \frac{\sin + 1}{\sin - 1}$$

$$\frac{1+\sin x}{1-\sin x} - \frac{(\sin + 1)}{1-\sin x}$$

$$= \frac{0}{1-\sin x}$$

$$= 0$$

d) $\frac{\cos \theta \tan \theta + \cos \theta}{\cos^2 \theta + \sin \theta \cos \theta}$

$$\frac{\cos(\tan + 1)}{\cos(\cos + \sin)}$$

$$\frac{\tan + 1}{\cos + \sin}$$