21 First sketch possible angles for α and β. See *Figures 21a & 21b*. Note: $\cos\alpha = \frac{4}{5}$ and $\cos\beta = \frac{12}{13}$.

(a) $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta = \left(\frac{3}{5}\right)\left(\frac{12}{13}\right) + \left(\frac{4}{5}\right)\left(\frac{5}{13}\right) = \frac{36}{65} + \frac{20}{65} = \frac{56}{65}$

(b) $\cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta = \left(\frac{4}{5}\right)\left(\frac{12}{13}\right) - \left(\frac{3}{5}\right)\left(\frac{5}{13}\right) = \frac{48}{65} - \frac{15}{65} = \frac{33}{65}$

(c) $\tan(\alpha+\beta) = \frac{\sin(\alpha+\beta)}{\cos(\alpha+\beta)} = \frac{\frac{56}{65}}{\frac{33}{65}} = \frac{56}{65}\cdot\frac{65}{33} = \frac{56}{33}$

(d) Since both $\sin(\alpha+\beta)$ and $\cos(\alpha+\beta)$ are positive, $\alpha+\beta$ is in quadrant I.

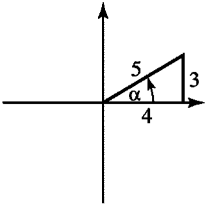

Figure 21a

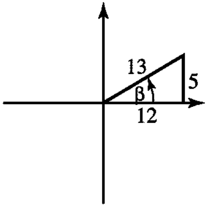

Figure 21b