

## Trigonometric Relations Part 2

### Solution

$$\begin{aligned}
 6. \quad (a) \quad \tan(90^\circ - \theta) \cos(90^\circ - \theta) &= \frac{1}{\tan \theta} \sin \theta \\
 &= \frac{\cos \theta}{\sin \theta} \sin \theta \\
 &= \cos \theta
 \end{aligned}$$

$$\begin{aligned}
 (b) \quad \frac{\tan(90^\circ - \theta)}{\sin(90^\circ - \theta)} + \frac{\sin(90^\circ - \theta)}{\tan(90^\circ - \theta)} &= \frac{1}{\tan \theta \cos \theta} + \frac{\cos \theta \tan \theta}{1} \\
 &= \frac{\cos \theta}{\sin \theta \cos \theta} + \frac{\cos \theta \sin \theta}{\cos \theta} \\
 &= \frac{1}{\sin \theta} + \sin \theta \\
 &= \frac{1 + \sin^2 \theta}{\sin \theta}
 \end{aligned}$$

$$\begin{aligned}
 (c) \quad \frac{1}{\sin \theta} - \frac{\sin^2(90^\circ - \theta)}{\cos(90^\circ - \theta)} &= \frac{1}{\sin \theta} - \frac{\cos^2 \theta}{\sin \theta} \\
 &= \frac{1 - \cos^2 \theta}{\sin \theta} \\
 &= \frac{\sin^2 \theta}{\sin \theta} \\
 &= \sin \theta
 \end{aligned}$$

$$\begin{aligned}
 7. \quad \tan^2 \phi - \frac{1}{\cos^2 \phi} &= \frac{\sin^2 \phi}{\cos^2 \phi} - \frac{1}{\cos^2 \phi} \\
 &= \frac{1 - \sin^2 \phi}{\cos^2 \phi} \\
 &= \frac{\cos^2 \phi}{\cos^2 \phi} \\
 &= 1
 \end{aligned}$$