9. $\sin(t)\cos(t) = \frac{\sin(2t)}{2}$ $\quad p = \frac{2\pi}{2} = \pi$

General form of Fourier Series: $A_0 + \sum_{n=1}^{\infty}\left(A_n \cos\left(\frac{2\pi n x}{p}\right)\right.$

$\left. + B_n \sin\left(\frac{2\pi n x}{p}\right)\right)$

Let $A_0 = 0 = A_n \; \forall n$. Let $B_1 = \frac{1}{2}$, $B_n = 0 \quad \forall n, n>1$

$p = \pi$

Then $\sin(t)\cos(t) = B_1 \cdot \sin(2t) = \frac{1}{2}\sin(2t)$ ✓

Formulas for $\cos(t)\sin(t)$