

Complete as many of the following problems as you can with your table. You do not have to go in order. If **your entire group** finishes early, and your answers have been checked, you may leave early.

1. Simplify the following using addition formulas:

(a) $\cos\left(\frac{\pi}{8}\right)\cos\left(x - \frac{3\pi}{8}\right) + \sin\left(\frac{\pi}{8}\right)\sin\left(x - \frac{3\pi}{8}\right)$

(b) $\sin\left(\frac{5\pi}{8}\right)\cos\left(x + \frac{3\pi}{8}\right) + \cos\left(\frac{5\pi}{8}\right)\sin\left(x + \frac{3\pi}{8}\right)$

(c) $\sin\left(\frac{\pi}{4} + s\right) - \sin\left(\frac{\pi}{4} - s\right)$

(d) $\cos\left(\frac{\pi}{3} - \theta\right) - \cos\left(\frac{\pi}{3} + \theta\right)$

2. Given $\tan s = \frac{1}{2}$ and $\tan t = \frac{1}{3}$, find $\tan(s + t)$ and $\tan(s - t)$.

3. Verify the following identities:

(a) $\cos(2t) = \cos^2 t - \sin^2 t$

(b) $\tan(x - y) - \tan(y - x) = \frac{2(\tan x - \tan y)}{1 + \tan x \tan y}$

Key:

1. (a) $\sin x$
(b) $-\sin x$
(c) $\sqrt{2} \sin s$

- (d) $\sqrt{3} \sin \theta$
2. 1 and $\frac{1}{7}$