

6.3 In-class Practice

1. Given the information, find $\sin 2x$, $\cos 2x$, and $\tan 2x$.

a) $\sin x = \frac{5}{13}$, $x \in \text{QI}$

b) $\tan x = -\frac{4}{3}$, $x \in \text{QII}$

c) $\sec x = 2$, $x \in \text{QIV}$

2. Using power reduction formulas, rewrite the expression in terms of the first power of cosine.

a) $\sin^4 x$

b) $\cos^4 x$

3. Use half-angle formulas to find the exact value of the expression.

a) $\sin 15^\circ$

b) $\tan 15^\circ$

c) $\tan 22.5^\circ$

d) $\sin 75^\circ$

e) $\cos \frac{\pi}{12}$

f) $\tan \frac{5\pi}{12}$

g) $\sin \frac{9\pi}{8}$

h) $\sin \frac{11\pi}{12}$

4. Simplify the expression, using a double-angle or a half-angle formula.

a) $2\sin 18^\circ \cos 18^\circ$

b) $\frac{1 - \cos 4\theta}{\sin 4\theta}$

c) $\frac{2 \tan 7^\circ}{1 - \tan^2 7^\circ}$

d) $\sqrt{\frac{1 - \cos 8\theta}{2}}$

e) $\cos^2 34^\circ - \sin^2 34^\circ$

f) $\cos^2 \frac{\theta}{2} - \sin^2 \frac{\theta}{2}$

5. Find $\sin \frac{x}{2}$, $\cos \frac{x}{2}$, and $\tan \frac{x}{2}$ from the given information.

a) $\sin x = \frac{3}{5}$, $0^\circ < x < 90^\circ$

b) $\cos x = -\frac{4}{5}$, $180^\circ < x < 270^\circ$

c) $\tan \left(x + \frac{\pi}{2} \right) = -\cot x$

d) $\csc x = 3$, $90^\circ < x < 180^\circ$

6. Prove the identity.

a) $\cos^2 5x - \sin^2 5x = \cos 10x$

b) $\sin 8x = 2 \sin 4x \cos 4x$

c) $(\sin x + \cos x)^2 = 1 + \sin 2x$

d) $\frac{2 \tan x}{1 + \tan^2 x} = \sin 2x$

e) $\frac{\sin 4x}{\sin x} = 4 \cos x \cos 2x$

f) $\frac{1 + \sin 2x}{\sin 2x} = 1 + \frac{1}{2} \sec x \csc x$