4. Reduce the following expressions to a single term.

a) $1 - \sin^2 t$ _____ $cos^2\ t$ _____

b) $\sec^2 t - \tan^2 t$ _____ 1 _____

c) $\cot^2 t - \csc^2 t$ _____ -1 _____

d) $\sin t \sec t$ _____ $tan\ t$ _____

e) $\tan x \cdot \csc x$ _____ $sec\ x$ _____

f) $(1 - \sin^2 x) \sec^2 x$ _____ 1 _____

g) $(1 + \tan^2 x) \sin^2 x$ _____ $tan^2\ x$ _____

h) $\csc^2 x(1 - \cos^2 x)$ _____ 1 _____

i) $(\sec^2 x - 1) \cot^2 x$ _____ 1 _____

j) $\csc^2 x - \cot^2 x - \sin^2 x$ _____ $cos^2\ x$ _____

5. Express each of the following trigonometric ratios in terms of $\sin x$ knowing that $0 \leqslant x \leqslant \frac{\pi}{2}$.

a) $\cos x$ _____ $\sqrt{1 - sin^2\ x}$ _____

b) $\tan x$ _____ $\dfrac{sin\ x}{\sqrt{1 - sin^2\ x}}$ _____

c) $\cot x$ _____ $\dfrac{\sqrt{1 - sin^2\ x}}{sin\ x}$ _____

d) $\sec x$ _____ $\dfrac{1}{\sqrt{1 - sin^2\ x}}$ _____

6. If $\sin t = 0.6$ and $\frac{\pi}{2} \leqslant t \leqslant \pi$, deduce the other 5 trigonometric ratios.

$cos\ t = -0.8,\ tan\ t = -\frac{3}{4},\ cot\ t = -\frac{4}{3},\ sec\ t = -\frac{5}{4},\ csc\ t = \frac{5}{3}.$

7. If $\cos t = \frac{12}{13}$ and $\frac{3\pi}{2} \leqslant t \leqslant 2\pi$, deduce the other 5 trigonometric ratios.

$sin\ t = \frac{-5}{13},\ tan\ t = \frac{-5}{12},\ cot\ t = \frac{-12}{5},\ sec\ t = \frac{13}{12},\ csc\ t = \frac{-13}{5}.$

8. If $\tan t = \frac{3}{4}$ and $0 \leqslant t \leqslant \frac{\pi}{2}$, deduce the other 5 trigonometric ratios.

$sec\ t = \frac{5}{4},\ cos\ t = \frac{4}{5},\ sin\ t = \frac{3}{5},\ cot\ t = \frac{4}{3},\ csc\ t = \frac{5}{3}.$

9. If $\cot t = \frac{-5}{12}$ and $\frac{3\pi}{2} \leqslant t \leqslant 2\pi$, deduce the other 5 trigonometric ratios.

$csc\ t = \frac{-13}{12},\ sin\ t = \frac{-12}{13},\ cos\ t = \frac{5}{13},\ tan\ t = \frac{-12}{5},\ sec\ t = \frac{13}{5}.$

10. Simplify the following expressions.

a) $\dfrac{\sin^2 x + \cos^2 x}{1 - \cos^2 x}$ _____ $csc^2\ x$ _____

b) $\dfrac{1 + \tan^2 x}{1 + \cot^2 x}$ _____ $tan^2\ x$ _____

c) $\dfrac{\sec^2 x - \tan^2 x}{1 - \sin^2 x}$ _____ $sec^2\ x$ _____

d) $\dfrac{\sec^2 x - 1}{\csc^2 x} \cdot \dfrac{\cot^2 x}{\sin^2 x}$ _____ 1 _____

11. Simplify the following expressions.

a) $\dfrac{1 - \cos^2 x}{1 - \sin^2 x}$ _____ $tan^2\ x$ _____

b) $\dfrac{1 + \tan^2 x}{1 + \cot^2 x}$ _____ $tan^2\ x$ _____

c) $(1 + \sec x)(1 - \sec x)$ _____ $-tan^2\ x$ _____

d) $\dfrac{\csc^2 x - \cot^2 x}{\cos^2 x}$ _____ $sec^2\ x$ _____

12. Perform the following operations.

a) $\dfrac{1}{1 + \sin x} + \dfrac{1}{1 - \sin x} =$ _____ $2\ sec^2\ x$ _____

b) $\dfrac{\cos x}{\sec x + 1} + \dfrac{\cos x}{\sec x - 1} =$ _____ $\dfrac{2}{tan^2\ x}$ _____