

## Trigonometric Equations Test 90

1) Solve the following equations for  $x$ .  $0 \leq x < 360$

a)  $\tan x = \sqrt{3}$

b)  $2\cos^2 x = \cos x$

c)  $\sin^2 x + \sin x - 2 = 0$

2) Simplify:

a)  $\sin x \cot x$

b)  $\csc x \sin x$

c)  $1/\cot x$

d)  $\cos x (\sec x + \tan x)$

e)  $(\cos x + \sin x)^2$

f)  $1 - \cos^2 x$

g)  $\cot^2 x - \csc^2 x$

h)  $\cos x \sec x + \sin x \tan x / \cos x$

3) Prove the identities:

a)  $\sin x \sec x \cot x = 1$

b)  $\cos x (\csc x - \sec x) = \cot x - 1$

c)  $\sin^2 x - \cos^2 x = 2\sin^2 x - 1$

d)  $\sin x / (1 - \cos x) = (1 + \cos x) / \sin x$

e)  $(1 + \csc x)(1 - \sin x) = \cot x \cos x$

f)  $\tan^2 x - \sin^2 x = \sin^2 x \tan^2 x$

4) Use the sum and difference identities to find the exact value of  $\cos 105^\circ$ .

5) Use the sum and difference identities to simplify the following:

a)  $\sin 20 \cos 15 + \cos 20 \sin 15$

b)  $\cos 70 \cos 30 + \sin 70 \sin 30$

c)  $(\tan 120 - \tan 70)/(1 + \tan 120 \tan 70)$

d)  $\sin(90 - x)$

6) Use the double angle formulas to simplify the following:

a)  $4\sin 25 \cos 25$

b)  $2\sin^2 10 - 1$

7) Use the double angle formulas to prove the following identities.

a)  $\sin^2 x (\cot^2 x - 1) = \cos 2x$

b)  $\sin 2x / \cos^2 x = 2 \tan x$

Answers: 1)a) 60, 240, b) 60, 90, 270, 300, c) 90, 2)a)  $\cos x$ , b) 1, c)  $\tan x$ , d)  $1 + \sin x$ , e)  $1 + 2\sin x \cos x$ , f)  $\sin^2 x$ , g) -1, h)  $\sec^2 x$ , 4)  $(\sqrt{2} - \sqrt{6})/4$ , 5)a)  $\sin 35$ , b)  $\cos 40$ , c)  $\tan 50$ , d)  $\cos x$ , 6)a)  $2\sin 50$ , b)  $-\cos 20$ .