

Name: _____ Date: 10/30/25

Test Prep 4

(This test is no calculator, so try your best to do this with no calculator)

1. Proving Identities

a) $\cos^2(\pi/2 - y) \csc y = \sin y$

b) $\cot(-a) \cos(-a) + \sin(-a) = -\csc(a)$

c) $\frac{\cos x}{\sec x} + \frac{\sin x}{\csc x} = 1$

2. Substitute $\tan \theta$ for x in the expression $\frac{1}{1+x^2}$. Assume $0 \leq \theta \leq \pi/2$

3. Find which formula to use, then solve

a) $\cos 23^\circ \cos 67^\circ - \sin 23^\circ \sin 67^\circ$

b) $\frac{\tan 55^\circ - \tan 10^\circ}{1 + \tan 55^\circ \tan 10^\circ}$

$$c) \cos 75^\circ$$

$$135^\circ - 120^\circ$$

$$45^\circ + 30^\circ$$

$$225^\circ - 150^\circ$$

4. Find the exact value of $\sin(s+t)$ given $\sin s = 4/5$, $0 < s < \pi/2$, and $\cos t = -4/8$, $\pi/2 < t < \pi$

Double Angles !!

5 Find $\sin 2x$, $\cos 2x$ and $\tan 2x$

a) $\tan x = -1/3$, $\cos x > 0$

b) $\sec x = 2$, x in Quadrant IV

6. Write $\sin 3x$ in terms of $\sin$

7. Prove the identity

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

8. Evaluate $\sin(2\cos^{-1}(-2/5))$

Half-angle formulas

9. Find the exact value of $\sin 15^\circ$

10. Find the exact value of $\cos \pi/12$

11. Given $\sin u = \frac{3}{5}$, find $\tan(\frac{u}{2})$

Lowering powers

12. Lower the powers and rewrite the expression in terms of the first power of cosine

a) $\sin^4 x$

Product-to-sum formulas

13. Write the products as a sum

a) $\sin 5x \cos 4x$

$$b) \cos x \sin 4x$$

Sum-to-product formulas

14. Write the sum as a product

$$a) \sin 7x + \sin 5x$$

$$b) \cos 4x - \cos 12x$$

Solving basic trigonometric equations

list solutions from $[0, 2\pi]$

a) $\cos \theta = -\sqrt{3}/2$

b) $\sin \theta = 1/2$

list ALL possible solutions

c) $2\sin^2 \theta - \sin \theta - 1 = 0$

d) $\sin^2 \theta = 2\sin \theta + 3$

