

1. Find the value of the following.

a)  $\sin 105^\circ$

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

c)  $\tan \frac{11\pi}{12}$

2. Given that  $\sin \alpha = \frac{5}{13}$   $\left(\frac{\pi}{2} < \alpha < \pi\right)$  and  $\cos \beta = -\frac{4}{5}$   $\left(\pi < \beta < \frac{3\pi}{2}\right)$ . Find the following.

a)  $\sin(\alpha - \beta)$

b)  $\sec(\alpha - \beta)$

3. Write the trig expression as an algebraic expression.  $\cos(\arctan 2x - \arcsin x)$

4. Find the exact values of  $\sin 2u$ ,  $\cos 2u$ , and  $\tan 2u$ . Given the following.

a)  $\tan u = -\frac{5}{3}, \left(\frac{\pi}{2} < u < \pi\right)$

b)  $\sec u = -4, \left(\pi < u < \frac{3\pi}{2}\right)$

5. Write  $\sin^4 x$  in terms of the first power of cosine.

6. Find the exact values of  $\sin \frac{u}{2}$ ,  $\cos \frac{u}{2}$ , and  $\tan \frac{u}{2}$ . Given the following.

a)  $\sin u = -\frac{3}{5}, \left(\pi < u < \frac{3\pi}{2}\right)$

b)  $\cot u = -3, \left(\frac{3\pi}{2} < u < 2\pi\right)$

7. Write the following sums as products and write the products as sums.

a)  $8\cos 2x \sin 7x$

b)  $\sin 3x - \sin 9x$

c)  $\sin(x+y)\cos(x-y)$

d)  $\sin(x+\pi) + \sin(x-\pi)$

8. Solve the following in the interval  $[0, 2\pi)$ .

a)  $\sin 2x = \cos x$

b)  $\tan^2 3x = 3$

c)  $4\cos^2 x = 1$

c)  $\tan^2 x - 6\tan x + 4 = 0$

d)  $\sin\left(x + \frac{\pi}{4}\right) + \sin\left(x - \frac{\pi}{4}\right) = -1$

e)  $\sin \frac{x}{2} + \cos x - 1 = 0$