4.3 Sum and Difference Properties (1) **Name:**_____

Use the cofunction properties to find an equivalent expression:

1. $\sin 52^o$

$\cos(90-52)$

$\boxed{\cos 38^\circ}$

2. $\cot 43^o$

$\tan 47^\circ$

3. $\sec\frac{2\pi}{5}$

$\csc\left(\frac{\pi}{2}-\frac{2\pi}{5}\right)$

$\csc\left(\frac{5\pi}{10}-\frac{4\pi}{10}\right)=\boxed{\csc\frac{\pi}{10}}$

4. $\cos\frac{\pi}{4}$

$\sin\frac{\pi}{4}$

5. $\csc\frac{3\pi}{8}$

$\sec\frac{\pi}{8}$

Rewrite each expression with a positive argument using the odd/even properties:

6. $\sin(-70^o)$

$-\sin 70^\circ$

7. $\sec(-25^o)$

$\sec 25^\circ$

8. $\tan\left(-\frac{5\pi}{7}\right)$

$-\tan\frac{5\pi}{7}$

9. $\cos\left(-\frac{\pi}{5}\right)$

$\cos\frac{\pi}{5}$

10. $\cot(-35^o)$

$-\cot 35^\circ$

11. $\csc\left(-\frac{8\pi}{13}\right)$

$-\csc\frac{8\pi}{13}$

Simplify the given expression using the sum and difference properties:

12. $\sin 5 \cdot \cos 3 - \cos 5 \cdot \sin 3$

A B B A

$\sin(A-B)=\sin A\cos B-\cos A\sin B$

$\sin(5-3)=\boxed{\sin 2}$

13. $\cos 37^o \cdot \cos 23^o - \sin 37^o \cdot \sin 23^o$

$\cos(37+23)=\cos 60^\circ$

$\frac{1}{2}$

14. $\dfrac{\tan 2x+\tan 5x}{1-\tan 2x \cdot \tan 5x}$

$\tan(2x+5x)$

$\tan(7x)$

15. $\cos(x+y)\cdot\cos y+\sin(x+y)\cdot\sin y$

$\cos((x+y)-y)=\cos x$

16. $\sin\frac{5\pi}{12}\cos\frac{\pi}{12}-\cos\frac{5\pi}{12}\sin\frac{\pi}{12}$

$\sin\left(\frac{5\pi}{12}-\frac{\pi}{12}\right)=\sin\frac{\pi}{3}$

$\frac{\sqrt{3}}{2}$

17. $\dfrac{1+\tan 3x\tan 4x}{\tan 3x-\tan 4x}=\dfrac{1}{\tan(3x-4x)}$

$\cot(-x)$ or $-\cot x$