

23. $\sin\left(x - \frac{\pi}{2}\right) = -\cos x$

$$\sin x \cos \frac{\pi}{2} - \cos x \sin \frac{\pi}{2} = \sin x(0) - \cos x(1) = -\cos x \checkmark$$

25. $\cos\left(x - \frac{\pi}{2}\right) = \sin x$

$$\cos x \cos \frac{\pi}{2} + \sin x \sin \frac{\pi}{2} = \cos x(0) + \sin x(1) = \sin x \checkmark$$



$\frac{\pi}{2} = \text{undefined}$
 $\tan \frac{\pi}{2} = \frac{\sin}{\cos}$
 $\frac{\sin\left(x - \frac{\pi}{2}\right)}{\cos\left(x - \frac{\pi}{2}\right)}$

24. $\tan\left(x - \frac{\pi}{2}\right) = -\cot x$

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

$$\frac{-\cos x}{\sin x} = -\cot x \checkmark$$

$$47. \sin(x-y) + \sin(x+y) = 2 \sin x \cos y$$

$$\sin x \cos y - \cos x \sin y + \sin x \cos y + \cos x \sin y = 2 \sin x \cos y \quad \checkmark$$

$$48. \cos(x-y) + \cos(x+y) = 2 \cos x \cos y$$

$$\cos x \cos y + \sin x \sin y + \cos x \cos y - \sin x \sin y = 2 \cos x \cos y \quad \checkmark$$

$$50. \sin 3u = 3 \cos^2 u \sin u - \sin^3 u$$

$$\sin(u+u) = \sin^2 u + \cos^2 u \sin u$$

$$\sin^2 u \cos u + \cos^2 u \sin u =$$

$$(\sin u \cos u + \cos u \sin u) \cos u + (\cos u \cos u - \sin u \sin u) \sin u =$$

$$\sin u \cos^2 u + \sin u \cos^2 u + \sin u \cos^2 u - \sin^3 u =$$

$$3 \sin u \cos^2 u - \sin^3 u$$

$$51. \cos 3x + \cos x = 2 \cos 2x \cos x$$

$$\cos(2x+x) + \cos(2x-x) =$$

~~$2 \cos 2x \cos x + 2 \cos 2x \cos x$~~

$$2 \cos 2x \cos x \checkmark$$