Secondary 3 Honors Name: key Period: ________

11.3: Sum and Difference Identities Practice

Find the exact value of the expression.

1. $\sin 75°$

$\sin(30° + 45°)$

$\sin 30° \cos 45° + \sin 45° \cos 30°$

$\left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)$

$\frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4} = \boxed{\frac{\sqrt{6}+\sqrt{2}}{4}}$

2. $\sin 375°$

3. $\cos 15° = \cos(45° - 30°)$

$\cos 45° \cos 30° + \sin 45° \sin 30°$

$\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right)$

$\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} = \boxed{\frac{\sqrt{6}+\sqrt{2}}{4}}$

4. $\sin\left(\frac{5\pi}{4} - \frac{\pi}{6}\right)$

5. $\sin\left(\frac{4\pi}{3} + \frac{\pi}{4}\right)$

$\sin\frac{4\pi}{3}\cos\frac{\pi}{4} + \sin\frac{\pi}{4}\cos\frac{4\pi}{3}$

$\left(-\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(-\frac{1}{2}\right)$

$-\frac{\sqrt{6}}{4} + -\frac{\sqrt{2}}{4} = \boxed{\frac{-\sqrt{6}-\sqrt{2}}{4}}$

6. $\cos\left(\frac{3\pi}{4} + \frac{\pi}{6}\right)$

Write each expression in terms of a single trigonometric function.

7. $\sin \overset{\alpha}{7x} \cos \overset{\beta}{2x} - \cos 7x \sin 2x$

$\sin(7x - 2x) = \boxed{\sin(5x)}$

8. $\sin x \cos 3x + \cos x \sin 3x$

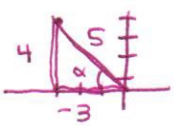
9. $\cos \overset{\alpha}{x} \cos \overset{\beta}{2x} + \sin x \sin 2x$

$\cos(x - 2x) = \boxed{\cos(-x)}$

10. $\cos 4x \cos 2x - \sin 4x \sin 2x$

Find the exact value of the given functions.

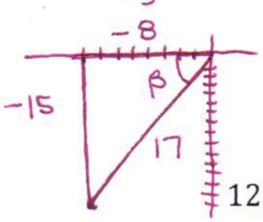
11. Given $\tan\alpha = -\frac{4}{3}$ in Quadrant II, and $\tan\beta = \frac{15}{8}$ in Quadrant III, find the following



a. $\sin(\alpha - \beta) = \sin\alpha\cos\beta - \sin\beta\cos\alpha$

$\left(\frac{4}{5}\right)\left(-\frac{8}{17}\right) - \left(-\frac{15}{17}\right)\left(-\frac{3}{5}\right)$

$-\frac{32}{85} - \frac{45}{85} = \boxed{\frac{-77}{85}}$



b. $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$

$\left(-\frac{3}{5}\right)\left(-\frac{8}{17}\right) - \left(\frac{4}{5}\right)\left(-\frac{15}{17}\right)$

$\frac{24}{85} - \frac{-60}{85}$ $\boxed{\frac{84}{85}}$

12. Given $\tan\alpha = \frac{24}{7}$ in Quadrant I, and $\sin\beta = -\frac{8}{17}$ in Quadrant III, find the following

a. $\sin(\alpha + \beta)$

b. $\cos(\alpha + \beta)$

13. Given $\sin\alpha = \frac{3}{5}$ in Quadrant I, and $\cos\beta = -\frac{5}{13}$ in Quadrant II, find the following

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

b. $\cos(\alpha + \beta)$

Verify the identity.

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

15. $\boxed{\cos(\theta + \pi)} = -\cos\theta$

$\cos\theta\cos\pi - \sin\theta\sin\pi$

$\cos\theta\,(-1) - \sin\theta\,(0)$

$-\cos\theta$ ▥

16. $\sin\left(\theta + \frac{\pi}{2}\right) = \cos\theta$

17. $\boxed{\sin(\theta + \pi)} = -\sin\theta$

$\sin\theta\cos\pi + \sin\pi\cos\theta$

$\sin\theta\,(-1) + (0)\cos\theta$

$-\sin\theta$ ▥

18. $\cos\left(\frac{3\pi}{2} - \theta\right) = -\sin\theta$

19. $\boxed{\sin\left(\frac{3\pi}{2} + \theta\right)} = -\cos\theta$

$\sin\frac{3\pi}{2}\cos\theta + \sin\theta\cos\frac{3\pi}{2}$

$(-1)\cos\theta + \sin\theta\,(0)$

$-\cos\theta$ ▥

20. $\cos 5x\cos 3x + \sin 5x\sin 3x = \cos^2 x - \sin^2 x$

21. $\boxed{\cos(\alpha + \beta) + \cos(\alpha - \beta)} = 2\cos\alpha\cos\beta$

$\cos\alpha\cos\beta - \cancel{\sin\alpha\sin\beta} + \cos\alpha\cos\beta + \cancel{\sin\alpha\sin\beta}$

$\cos\alpha\cos\beta + \cos\alpha\cos\beta$

$= 2\cos\alpha\cos\beta$ ▥

22. $\sin(\alpha + \beta) - \sin(\alpha - \beta) = 2\cos\alpha\sin\beta$