

WARM UP

Copy the six Sum and Difference Formulas found on page 380 into your notes. We will use these extensively today, and you will need to memorize them. **What patterns do you notice?**

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

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

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

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

$$\tan(u+v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$$

$$\tan(u-v) = \frac{\tan u - \tan v}{1 + \tan u \tan v}$$

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Example

Find the exact value of the expression.

$$\begin{aligned} \sin\left(\frac{2\pi}{3} + \frac{5\pi}{6}\right) &= \sin\left(\frac{2\pi}{3}\right)\cos\left(\frac{5\pi}{6}\right) + \cos\left(\frac{2\pi}{3}\right)\sin\left(\frac{5\pi}{6}\right) \\ &= \frac{\sqrt{3}}{2} \cdot \frac{-\sqrt{3}}{2} + \left(-\frac{1}{2}\right) \cdot \frac{1}{2} \\ &= \frac{-3}{4} + \frac{-1}{4} \\ &= \frac{-4}{4} \\ &= -1 \end{aligned}$$

p. 384: 1a (HW)

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Example

Find the exact value of the expression.

$$\begin{aligned} \cos(15^\circ) &= \cos(60^\circ - 45^\circ) \\ &= \cos 60^\circ \cos 45^\circ + \sin 60^\circ \sin 45^\circ \\ &= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} \\ &= \frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4} \\ &= \frac{\sqrt{2} + \sqrt{6}}{4} \end{aligned}$$

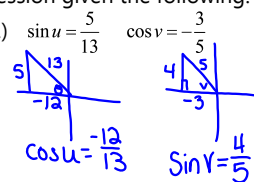
p. 384: 15 (HW)

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Example p. 384, #36

Find the exact value of the expression given the following.

(Both u and v are in Quadrant II.)



$$\cos(v-u) =$$

$$\cos v \cos u + \sin v \sin u$$

$$\frac{-3}{5} \cdot \frac{-12}{13} + \frac{4}{5} \cdot \frac{5}{13}$$

$$\frac{36}{65} + \frac{20}{65}$$

$$\frac{56}{65}$$

p. 384: 35 (HW)

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

$$\cos\left(x + \frac{\pi}{6}\right) - \cos\left(x - \frac{\pi}{6}\right) = 1$$

$$\left(\cancel{\cos x \cos \frac{\pi}{6}} - \sin x \sin \frac{\pi}{6}\right) + \left(\cancel{\cos x \cos \frac{\pi}{6}} + \sin x \sin \frac{\pi}{6}\right) = 1$$

$$-2\sin x \sin \frac{\pi}{6} = 1$$

$$-\frac{1}{1} \sin x \left(\frac{1}{2}\right) = \frac{1}{-1}$$

$$\sin x = -1$$

$$x = \frac{3\pi}{2}$$

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HOMEWORK

...sums and differences!

5.4 (p. 384): 1-25 (1's, 3's, 5's); 35, 39, 71

*21: Use $\pi/6 - 3\pi/4$

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