14.6 Apply Sum and Difference Formulas
pp. 949–954

EXAMPLE

Find the exact value of the expression.

a. $\cos 225° = \cos (270° - 45°)$ **Substitute 270° − 45° for 225°.**

$\qquad = \cos 270° \cos 45° + \sin 270° \sin 45°$ **Difference formula for cosine**

$\qquad = 0\left(\dfrac{\sqrt{2}}{2}\right) - 1\left(\dfrac{\sqrt{2}}{2}\right)$ **Evaluate.**

$\qquad = -\dfrac{\sqrt{2}}{2}$ **Simplify.**

b. $\sin \dfrac{7\pi}{12} = \sin\left(\dfrac{\pi}{3} + \dfrac{\pi}{4}\right)$ **Substitute $\dfrac{\pi}{3} + \dfrac{\pi}{4}$ for $\dfrac{7\pi}{12}$.**

$\qquad = \sin \dfrac{\pi}{3} \cos \dfrac{\pi}{4} + \cos \dfrac{\pi}{3} \sin \dfrac{\pi}{4}$ **Sum formula for sine**

$\qquad = \dfrac{\sqrt{3}}{2}\left(\dfrac{\sqrt{2}}{2}\right) + \dfrac{1}{2}\left(\dfrac{\sqrt{2}}{2}\right)$ **Evaluate.**

$\qquad = \dfrac{\sqrt{6} + \sqrt{2}}{4}$ **Simplify.**

EXERCISES

EXAMPLES 1 and 2
on pp. 949–950
for Exs. 26–30

Find the exact value of the expression.

26. $\cos 195°$ **27.** $\tan 75°$ **28.** $\sin \dfrac{13\pi}{12}$ **29.** $\cos \dfrac{5\pi}{6}$

30. Find $\cos (a - b)$, given that $\sin a = \dfrac{8}{17}$ with $\dfrac{\pi}{2} < a < \pi$ and $\cos b = \dfrac{1}{2}$ with $0 < b < \dfrac{\pi}{2}$.

14.7 Apply Double-Angle and Half-Angle Formulas
pp. 955–962

EXAMPLE

Find the exact value of the expression.

a. $\tan 135° = \tan \dfrac{1}{2}(270°) = \dfrac{1 - \cos 270°}{\sin 270°} = \dfrac{1 - 0}{-1} = -1$

b. $\sin \dfrac{\pi}{12} = \sin \dfrac{1}{2}\left(\dfrac{\pi}{6}\right) = \sqrt{\dfrac{1 - \cos \dfrac{\pi}{6}}{2}} = \sqrt{\dfrac{1 - \dfrac{\sqrt{3}}{2}}{2}} = \dfrac{1}{2}\sqrt{2 - \sqrt{3}}$

EXERCISES

EXAMPLES 1 and 2
on pp. 955–956
for Exs. 31–35

Find the exact value of the expression.

31. $\sin 75°$ **32.** $\tan (-15°)$ **33.** $\cos \dfrac{\pi}{12}$ **34.** $\cos \dfrac{3\pi}{4}$

35. Given $\cos a = \dfrac{1}{2}$ with $0 < a < \dfrac{\pi}{2}$, find $\sin 2a$ and $\tan \dfrac{a}{2}$.