PRACTICE equivalent Expressions – Solutions to 6.4 #4, #8

4. State an equivalent expression ~~in terms of the related acute angle.~~

a) $\sin \dfrac{5\pi}{6}$

c) $\cot \left(-\dfrac{\pi}{4} \right)$

b) $\cos \dfrac{5\pi}{3}$

d) $\sec \dfrac{7\pi}{6}$

8. State an equivalent expression ~~in terms of the related acute angle.~~

a) $\cos \dfrac{3\pi}{4}$

c) $\csc \left(-\dfrac{\pi}{3} \right)$

e) $\sin \dfrac{-\pi}{6}$

b) $\tan \dfrac{11\pi}{6}$

d) $\cot \dfrac{2\pi}{3}$

f) $\sec \dfrac{7\pi}{4}$

PRACTICE equivalent Expressions – (Some Solutions) to 6.4 #4, #8

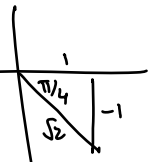**4.** State an equivalent expression ~~in terms of the related acute angle.~~

a) $\sin \dfrac{5\pi}{6}$

b) $\cos \dfrac{5\pi}{3}$

c) $\cot\left(-\dfrac{\pi}{4}\right)$

d) $\sec \dfrac{7\pi}{6}$

ⓒ $\cot\left(-\dfrac{\pi}{4}\right) = \dfrac{x}{y} = \dfrac{1}{-1}$

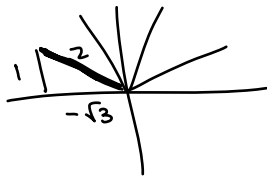$= \tan\left(-\pi/4\right)$ reciprocal of one is still one

$= \tan\left(\dfrac{3\pi}{4}\right)$ tangent is neg in II and IV by symmetry

$= \cot\left(\dfrac{7\pi}{4}\right)$ adding 2π to angle (twice the period)

$= -\tan\left(\pi/4\right)$ tangent is odd

etc.

ⓐ $\sin \dfrac{5\pi}{6}$

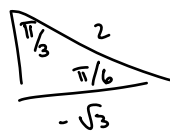$= \dfrac{y}{r} = \dfrac{1}{2}$

$= \sin \dfrac{\pi}{6}$ by symmetry   sine is pos in I and II

$= \cos \dfrac{\pi}{3}$ by cofunction complementary angles

$= \sin \dfrac{17\pi}{6}$ adding period 2π

$= \cos \dfrac{\pi}{3}$ shift cosine $\dfrac{\pi}{2}$ to the right, same as

$= -\sin\left(-\dfrac{5\pi}{6}\right)$ since sine is odd   etc!!

8. State an equivalent expression ~~in terms of the related acute angle.~~
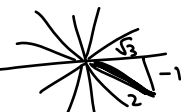
a) $\cos \dfrac{3\pi}{4}$

b) $\tan \dfrac{11\pi}{6}$

c) $\csc\left(-\dfrac{\pi}{3}\right)$

d) $\cot \dfrac{2\pi}{3}$

e) $\sin \dfrac{-\pi}{6}$

f) $\sec \dfrac{7\pi}{4}$

ⓑ $\tan \dfrac{11\pi}{6} = \dfrac{y}{x} = \dfrac{-1}{\sqrt{3}}$

$= -\dfrac{\sqrt{3}}{3}$
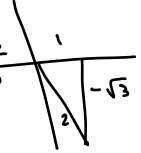
$= \tan\left(\dfrac{5\pi}{6}\right)$ ← since tangent is neg in II and IV by symmetry

(also subtract period π will be the same)

$= -\cot\left(\dfrac{\pi}{3}\right)$ ← cotangent is a reflection of tangent and shift of $\pi/2$ any direction

ⓒ $\csc\left(\dfrac{-\pi}{3}\right) = \dfrac{r}{y} = \dfrac{2}{-\sqrt{3}} = \dfrac{-2\sqrt{3}}{3}$

$= \csc\left(\dfrac{5\pi}{3}\right)$ adding period 2π

$= -\csc\left(\dfrac{\pi}{3}\right)$ cosecant is odd

$= -\sec\left(\dfrac{\pi}{6}\right)$ cofunction or complementary

$= \csc\left(\dfrac{4\pi}{3}\right)$ sine is neg in III, IV by symmetry

etc...