from 7.2 (part 1):

$$\cos(x \pm y) = \cos x \cdot \cos y \mp \sin x \cdot \sin y$$

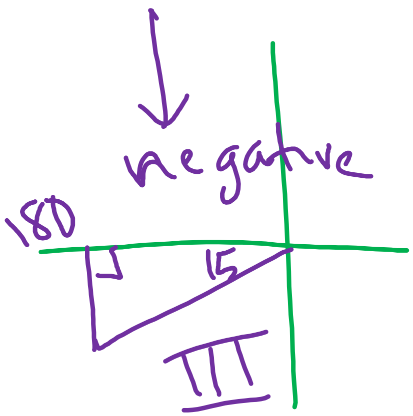
6. cos 195° $= \cos 15^\circ$

$= \cos(45^\circ - 30^\circ)$

$= \cos 45^\circ \cdot \cos 30^\circ + \sin 45^\circ \sin 30^\circ$

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

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



$$\begin{array}{r} 195 \\ -180 \\ \hline 15 \end{array}$$

$\cos 15^\circ = -\left(\frac{\sqrt{6}+\sqrt{2}}{4}\right)$

$\cos 195^\circ = \boxed{\frac{-\sqrt{6}-\sqrt{2}}{4}}$

$\theta=$	30°	45°	60°
sin θ	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
cos θ	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
tan θ	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

from 7.2 (part 1):

20. $\cos\frac{13\pi}{15}\cos\left(-\frac{\pi}{5}\right)-\sin\frac{13\pi}{15}\sin\left(-\frac{\pi}{5}\right)$

$x \quad y \quad x \quad y$

$=\cos\left(\frac{13\pi}{15}+-\frac{\pi}{5}\cdot\frac{3}{3}\right)$

$=\cos\left(\frac{13\pi}{15}+-\frac{3\pi}{15}\right)$

$=\cos\frac{10\pi}{15}$

$=\cos\frac{2\pi}{3}=120^\circ$

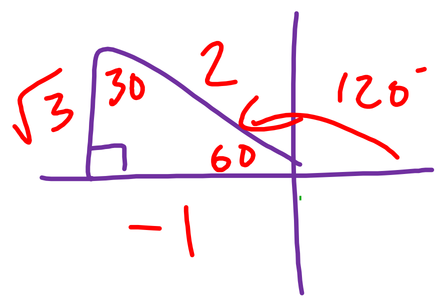
unit circle

$=-\frac{1}{2}$

$\sin(x\pm y)=\sin x\cdot\cos y\pm\cos x\cdot\sin y$

$\cos(x\pm y)=\cos x\cdot\cos y\mp\sin x\cdot\sin y$

$\theta=$	30°	45°	60°
$\sin\theta$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
$\cos\theta$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
$\tan\theta$	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$



from 7.2 (part 1): Prove the identity

31. $\sin(\frac{\pi}{2} - \boxed{x}) = \sin(\frac{\pi}{2} + x)$

HINT: REWRITE **BOTH** SIDES!!

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

$(\quad)\cos x - (\quad)\sin x = (\quad)\cos x + (\quad)\sin x$

$\boxed{\quad = \quad}$

$$\sin(x \pm y) = \sin x \cdot \cos y \pm \cos x \cdot \sin y$$

Today's assignment:

7.2 (part 2)

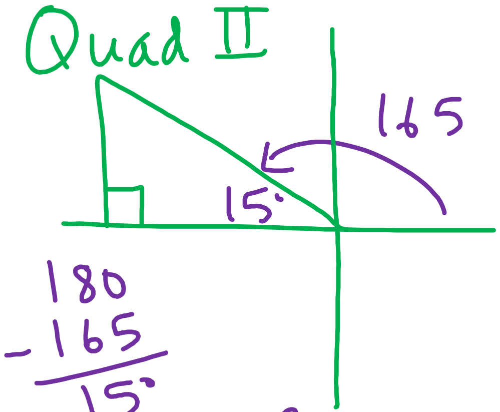
#8, 9, 56, 10-14

28-36even, 55,57

Find the exact value:

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}$$

8. $\tan 165° = \tan 15°$ ← solve for reference angle first



$$\begin{array}{r} 180 \\ -165 \\ \hline 15° \end{array}$$

reference angle

$$= \tan(45° - 30°) = \frac{\tan 45° - \tan 30°}{1 + (\tan 45°)(\tan 30°)}$$

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

See next slide

$\theta=$	30°	45°	60°
$\sin\theta$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
$\cos\theta$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
$\tan\theta$	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

$$\frac{1 - \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3}}$$

Cancel

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

$$= \frac{3 - \sqrt{3}}{3 + \sqrt{3}}$$

now simplify using the conjugate & FOIL

$$= \frac{(3-\sqrt{3})(3-\sqrt{3})}{(3+\sqrt{3})(3-\sqrt{3})}$$

$$= \frac{9 - 6\sqrt{3} + 3}{9 - 3}$$

$$= \frac{12 - 6\sqrt{3}}{6}$$

$$= 2 - \sqrt{3}$$

answer for reference angle. negative in Quad II

$$= -(2 - \sqrt{3})$$

$$= -2 + \sqrt{3}$$

or $\boxed{\sqrt{3} - 2}$

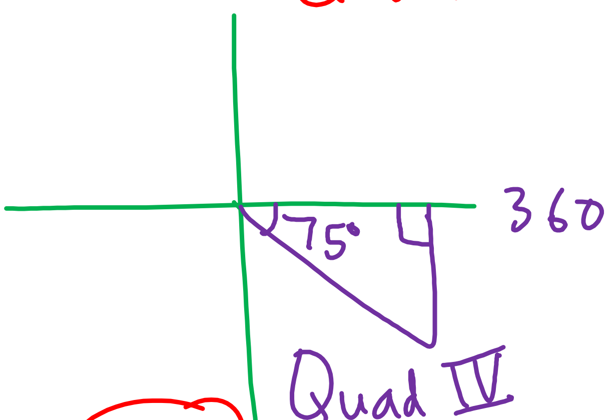
Find the exact value:

$$\sin(x \pm y) = \sin x \cdot \cos y \pm \cos x \cdot \sin y$$

9. $\sin\left(\frac{19\pi}{12}\right) = \sin\left(\frac{19(180)}{12}\right) = \sin 285^\circ$

= negative in Quad IV

So solve for the reference angle first



$$\begin{array}{r} 360 \\ -285 \\ \hline 75^\circ \end{array}$$ reference angle

$= \sin 75^\circ$

$= (\sin 30^\circ + 45^\circ)$

$= \sin 30^\circ \cos 45^\circ + \cos 30^\circ \sin 45^\circ$

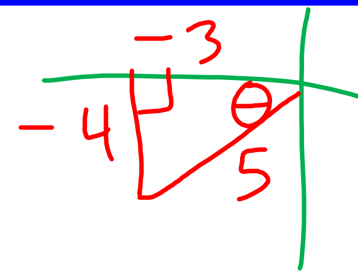
$= \left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$

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

answer for 75° $= \frac{\sqrt{2}+\sqrt{6}}{4} \longrightarrow \sin 285^\circ = -\left(\frac{\sqrt{2}+\sqrt{6}}{4}\right)$

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

Evaluate each expression using the given conditions.



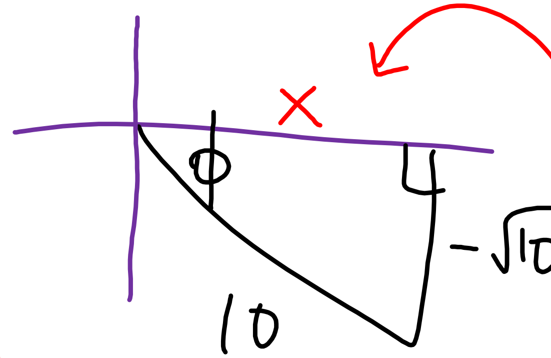
Sketch!

theta phi
given

56. $\sin(\theta - \phi)$ $\tan\theta = \dfrac{4}{3}$, θ in Quadrant III

$\sin\phi = -\dfrac{\sqrt{10}}{10}$, ϕ in Quadrant IV

Sketch!



write identity, then solve using triangles

$= \sin\theta \cdot \cos\phi - \cos\theta \cdot \sin\phi$

$= \left(\dfrac{-4}{5}\right) \cdot \left(\dfrac{3\sqrt{10}}{10}\right) - \left(-\dfrac{3}{5}\right) \cdot \left(-\dfrac{\sqrt{10}}{10}\right)$

$=$ now simplify

$=$

find x:

$x^2 + (-\sqrt{10})^2 = 10^2$

$x^2 + 10 = 100$

$x^2 = 90$

$x = \sqrt{90}$

$\sqrt{9}\sqrt{10}$

$x = 3\sqrt{10}$

✓CHECK EVEN ANSWERS (part 2)

10. $\dfrac{\sqrt{2}-\sqrt{6}}{4}$

12. $\dfrac{-\sqrt{6}-\sqrt{2}}{4}$ or $-\dfrac{\sqrt{6}+\sqrt{2}}{4}$

14. $-2-\sqrt{3}$

Α α	alpha	Η η	eta	Ν ν	nu	Τ τ	tau
Β β	beta	Θ θ	theta	Ξ ξ	ksi	Υ υ	upsilon
Γ γ	gamma	Ι ι	iota	Ο ο	omicron	Φ φ	phi
Δ δ	delta	Κ κ	kappa	Π π	pi	Χ χ	chi
Ε ε	epsilon	Λ λ	lambda	Ρ ρ	rho	Ψ ψ	psi
Ζ ζ	zeta	Μ μ	mu	Σ σ	sigma	Ω ω	omega

The Greek Alphabet