

7.2 WARM-UP: put at top of today's assignment

Simplify. (No decimals.)

a. $\sqrt{5} \cdot \sqrt{6} = \boxed{\sqrt{30}}$
 $\sqrt{5 \cdot 6}$

b. $\frac{\sqrt{21}}{\sqrt{3}} = \sqrt{\frac{21}{3}} = \boxed{\sqrt{7}}$

c. $\boxed{\sqrt{5} + \sqrt{6}}$
Simplified

d. $\boxed{\sqrt{21} - \sqrt{3}}$

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Rationalize each denominator.

e. $\frac{3\sqrt{6}}{2\sqrt{6}\sqrt{6}} = \frac{3\sqrt{6}}{12} = \boxed{\frac{\sqrt{6}}{4}}$

$\underbrace{2\sqrt{6}\sqrt{6}}_{2 \cdot 6}$

f. $\frac{\sqrt{2}\sqrt{5}}{3\sqrt{5}\sqrt{5}} = \boxed{\frac{\sqrt{10}}{15}}$

$\underbrace{\sqrt{5}\sqrt{5}}_5$

g. $\frac{\sqrt{2}(3-\sqrt{5})}{(3+\sqrt{5})(3-\sqrt{5})} = \frac{3\sqrt{2}-\sqrt{10}}{9-5} = \boxed{\frac{3\sqrt{2}-\sqrt{10}}{4}}$

$\underbrace{(3+\sqrt{5})(3-\sqrt{5})}_{\substack{3\sqrt{5} \\ -3\sqrt{5}}} = 0 \text{ middle term}$

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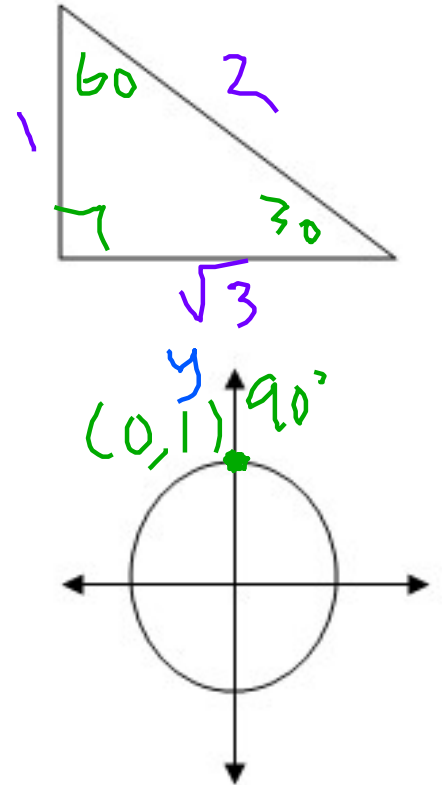
h. Is $\sin(x + y) = \sin x + \sin y$?

$$\sin(30^\circ + 60^\circ) = \sin 30^\circ + \sin 60^\circ$$

$$\sin(90^\circ) = \frac{1}{2} + \frac{\sqrt{3}}{2}$$

$$1 = 0.5 + 0.9$$

$$1 \neq 1.4$$



Notes 7.2: put on bright yellow sheet

Sum and Difference Identities:

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

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

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

Notes: for CSC, SEC, COT

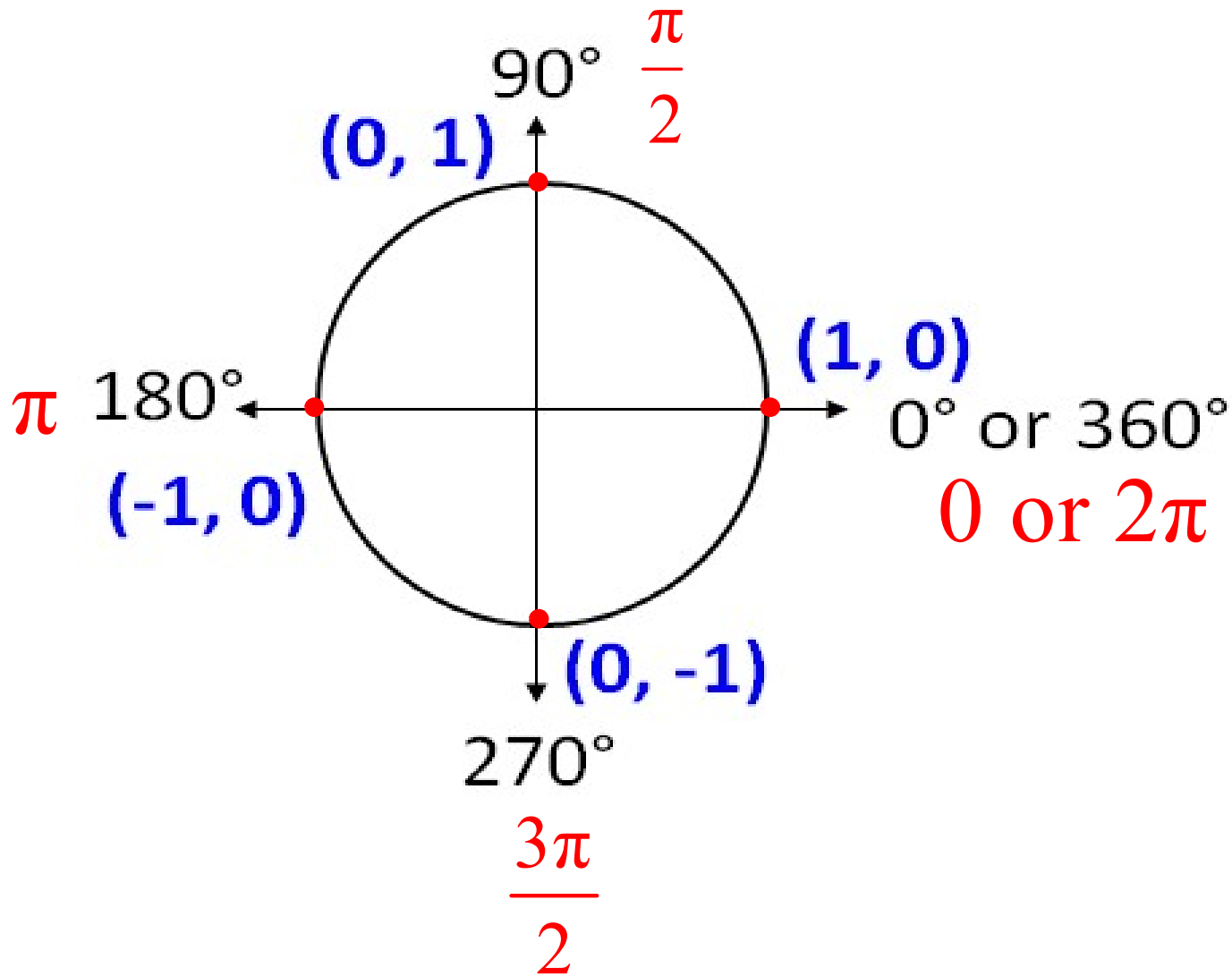
→ find sin, cos, tan and then flip to find reciprocal

Just use the symbols from the top row highlighted in blue OR the bottom row highlighted in yellow based on the operation in each given problem.

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$\theta =$	$\frac{\pi}{6}$ 30°	$\frac{\pi}{4}$ 45°	$\frac{\pi}{3}$ 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	$\sqrt{3}$

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Handwritten notes in a red cloud:

$$\sin \theta = \frac{y}{r} = y$$
$$\cos \theta = \frac{x}{r} = x$$
$$\tan \theta = \frac{y}{x}$$

if unit circle

Find the exact value:

3. $\sin 75^\circ$

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

Just use the symbols from the top row highlighted in blue since you have addition in the given problem.

$$\begin{aligned} \sin(30^\circ + 45^\circ) &= \sin 30^\circ \cos 45^\circ + \cos 30^\circ \sin 45^\circ \\ &= \left(\frac{1}{2} \cdot \frac{\sqrt{2}}{2}\right) + \left(\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}\right) \end{aligned}$$

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

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

$\theta =$	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	$\sqrt{3}$

Write as a function of one number, then find its exact value.

$$15. \quad \sin 18^\circ \cos 27^\circ + \cos 18^\circ \sin 27^\circ = \sin(18^\circ + 27^\circ)$$

x y

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

$$= \boxed{\frac{\sqrt{2}}{2}}$$

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

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

$\theta =$	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	$\sqrt{3}$

Prove the identity. (Same as **verify!**)

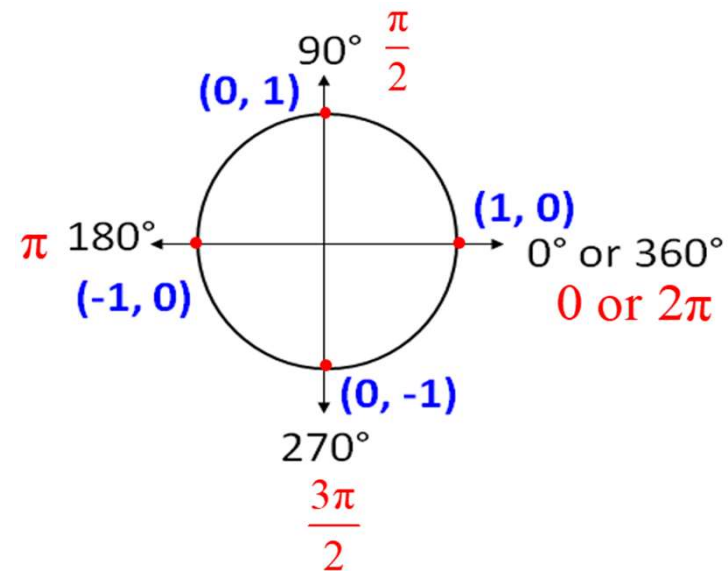
$$26. \cos\left(x - \frac{\pi}{2}\right) = \sin x$$

keep as is

$$\begin{aligned} \cos x \left(\cos \frac{\pi}{2}\right) + \sin x \left(\sin \frac{\pi}{2}\right) &= \sin x \\ \cancel{\cos x \cdot (0)} + \sin x (1) &= \sin x \end{aligned}$$

$$\boxed{\sin x = \sin x} \quad \checkmark$$

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



✓ CHECK EVEN ANSWERS for 7.2

4. $\frac{\sqrt{6} - \sqrt{2}}{4}$

6. $\frac{-\sqrt{6} - \sqrt{2}}{4}$

16. 0

18. $\frac{\sqrt{3}}{3}$

20. $-\frac{1}{2}$