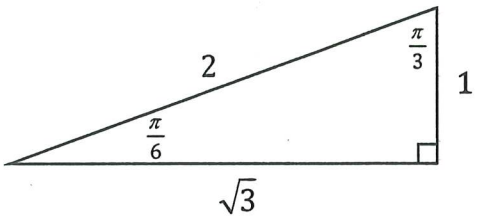
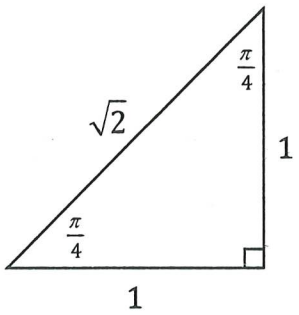
Pre-Calculus 12
9.2 – Solving Trig Equations Algebraically (Part I)

Name:_____
Block: _____

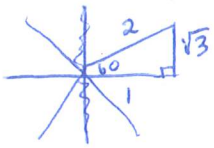
Review: Special Triangles



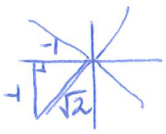


Ex. 1. Evaluate exactly using the special triangles above.

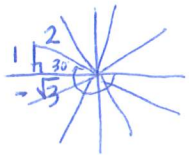
a) $\sin\frac{\pi}{3} = \frac{O}{H} = \boxed{\frac{\sqrt{3}}{2}}$



b) $\cos\frac{5\pi}{4} = \frac{A}{H} = \boxed{\frac{-1}{\sqrt{2}}}$



c) $\tan\left(-\frac{7\pi}{6}\right) = \frac{O}{A} = \boxed{\frac{1}{-\sqrt{3}}}$

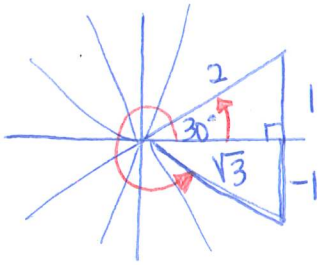


Note: Solving is the opposite of evaluating!

Ex. 2. Solve each equation for $0 \le x < 2\pi$ exactly (i.e. no decimals).

a) $\cos x = \frac{\sqrt{3}}{2} = \frac{A}{H}$

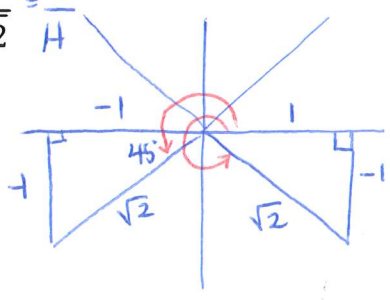
2 answers!



$x_1 = \frac{\pi}{6}$

$x_2 = \frac{11\pi}{6}$

b) $\sin x = -\frac{1}{\sqrt{2}} = \frac{O}{H}$



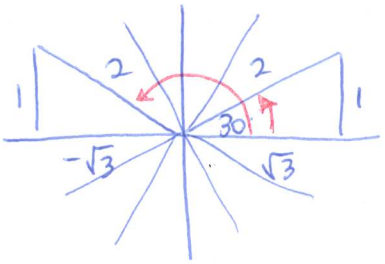
$x_1 = \frac{5\pi}{4}$

$x_2 = \frac{7\pi}{4}$

c) $\sin x - 4 = 3\sin x - 5$ ★ Solve for $\sin x$

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

$$\sin x = \frac{1}{2} = \frac{O}{H}$$



$x_1 = \frac{\pi}{6}$

$x_2 = \frac{5\pi}{6}$

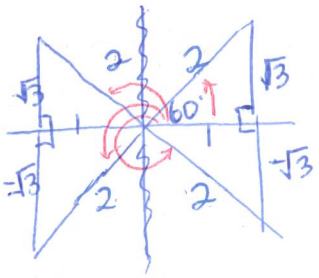
d) $4\cos^2 x - 1 = 0$

$$4\cos^2 x = 1$$

$$\sqrt{\cos^2 x} = \sqrt{\frac{1}{4}}$$

$$\cos x = \pm\frac{1}{2}$$

Don't forget!



$x_1 = \frac{\pi}{3}$

$x_2 = \frac{2\pi}{3}$

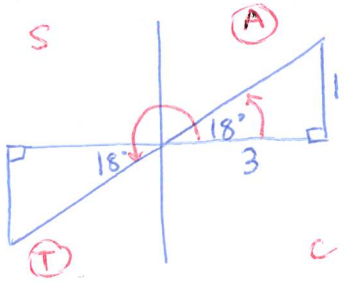
$x_3 = \frac{4\pi}{3}$

$x_4 = \frac{5\pi}{3}$

Ex. 2. Solve $\cot x = \frac{3}{1}$ for $0 \le x < 360°$ exactly.

$\Rightarrow \tan x = \frac{1}{3} = \frac{O}{A}$ ★ not a special △! use your calculator!

$\tan^{-1}\left(\frac{1}{3}\right) = 18°$



$x_1 = 18°$

$x_2 = 180° + 18° = 198°$

Note:

SIN ⊕	ALL ⊕
TAN ⊕	COS ⊕

ASTC

"All suckers take Calculus" ☺

p. 637 # 4, 5, 7, 8, 10, 11a, MC#1