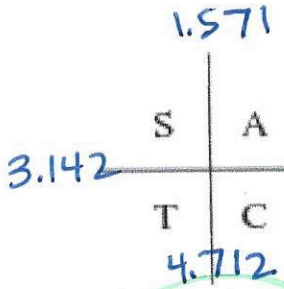
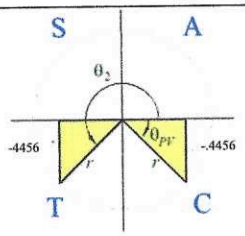
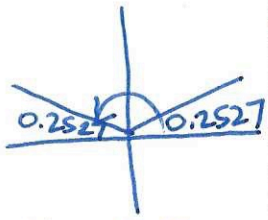
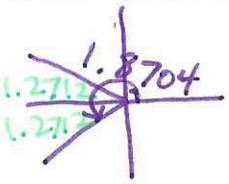
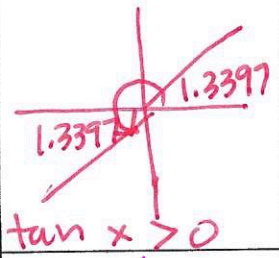
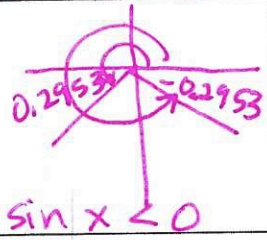
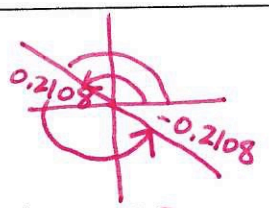
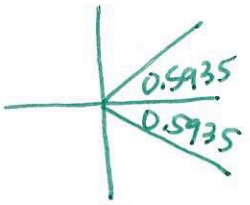
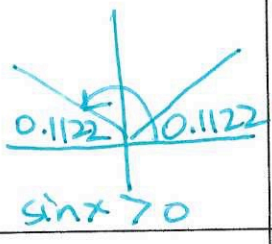
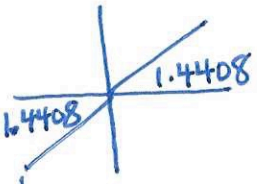
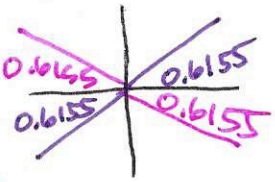
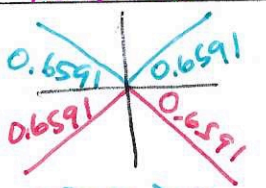
IN CLASS DRILL/PRACTICE
3.4 Part III
SOLVING TRIG EQUATIONS



make sure you are in radian mode.

Strategy 6: Solve Trig Equations by using inverse trig functions, CAST diagrams and a calculator. Express your answer as a radian measure and round to the nearest thousandth. Give the solutions on $[0, 2\pi)$

Equation	Principal Value (get this from calculator)	Appropriate Quadrant (from CAST diagram)	CAST Diagram	All Solutions On $[0, 2\pi)$
Example: $\sin(x) = -.431$	$\sin^{-1}(-0.431)$ $-.4456$	Sine negative in QIII and QIV		Q $x = 2\pi - .4456$ $= 5.838$ $x = \pi + .4456$ $= 3.587$ Q
$\sin(x) = \frac{1}{4}$	$\sin^{-1}\left(\frac{1}{4}\right) =$ 0.2527	sine positive QI and QII		QI $x = 0.2527$ QII $x = \pi - 0.2527$ 2.8889
$\cos(x) = -0.2951$	$\cos^{-1}(-0.2951)$ $= 1.8704$	cos negative in QII QIII		QII $x = 1.8704$ QIII $x = \pi + 1.2712$ $= 4.4128$
$\tan(x) = 4.25$	$\tan^{-1}(4.25) =$ $=1.3397$	tan positive in QI, QIII		QI $x = 1.3397$ QIII $x = \pi + 1.3397$ $= 4.4813$
$\sin(x) = -0.291$	$\sin^{-1}(-0.291)$ $= -0.2953$	sin negative in QIII, QIV		QIII $x = \pi + 0.2953$ $= 3.4369$ QIV $x = 2\pi - 0.2953$ $= 5.9879$

$\cos(x) = 3.2951$ out of range				No solution
$\tan(x) = -.214$	$\tan^{-1}(-0.214)$ $= -0.2108$	tan negative in QII, QIV	 tan < 0	QII $x = \pi - 0.2108$ $= 2.9308$ QIV $x = 2\pi - 0.2108 = 6.072$
$\cos(x) = 0.829$	$\cos^{-1}(0.829)$ $= 0.5935$	cos positive in QI, QIV	 cos x > 0	QI $x = 0.5935$ QIV $x = 2\pi - 0.5935$ $= 5.6897$
$\sin(x) = 0.112$	$\sin^{-1}(0.112)$ $= 0.1122$	sin positive in QI, QII	 sin x > 0	QI $x = 0.1122$ QII $x = \pi - 0.1122$ $= 3.0296$
$\tan(x) = 7.652$	$\tan^{-1}(7.652)$ $= 1.4408$	tan positive in QI, QIII	 tan x > 0	QI $x = 1.4408$ QIII $x = \pi + 1.4408$ $= 4.5824$
$2\tan^2(x) = 1$ $\tan^2(x) = \frac{1}{2}$ $\tan(x) = \pm\sqrt{\frac{1}{2}}$	$\tan^{-1}\left(\sqrt{\frac{1}{2}}\right)$ $= 0.6155$ $\tan^{-1}\left(-\sqrt{\frac{1}{2}}\right)$ $= -0.6155$	tan positive in QI, QIII tan negative in QII, QIV	 tan x > 0 tan x < 0	QI $x = 0.6155$ QII $x = \pi - 0.6155 = 2.5261$ QIII $x = \pi + 0.6155 = 3.7571$ QIV $x = 2\pi - 0.6155 = 5.6677$
$8\sin^2(x) = 3$ $\sin^2(x) = \frac{3}{8}$ $\sin(x) = \pm\sqrt{\frac{3}{8}}$	$\sin^{-1}\left(\sqrt{\frac{3}{8}}\right)$ $= 0.6591$ $\sin^{-1}\left(-\sqrt{\frac{3}{8}}\right)$ $= -0.6591$	sin positive in QI, QII sin negative in QIII, QIV	 sin x > 0 sin x < 0	QI $x = 0.6591$ QII $x = \pi - 0.6591 = 2.4825$ QIII $x = \pi + 0.6591 = 3.8007$ QIV $x = 2\pi - 0.6591 = 5.624$