

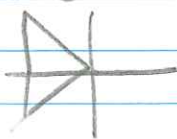
PW #1: Solve Trig Equations

① $\tan \theta = 1$ $\theta = \pi/4 + k\pi$ General



$\theta = \pi/4, 5\pi/4$ Primary

② $\cos \theta = -\sqrt{3}/2$ $\theta = 5\pi/6 + 2k\pi$ General



$\theta = 7\pi/6 + 2k\pi$

$\theta = 5\pi/6, 7\pi/6$ Primary

③ $\tan \theta = -\frac{\sqrt{3}}{3}$ $\theta = 5\pi/6 + k\pi$ General



$\theta = 5\pi/6, 11\pi/6$ Primary

④ $\cos \theta = 0$ $\theta = \pi/2 + k\pi$ General



$\theta = \pi/2, 3\pi/2$ Primary

⑤ $\sin \theta = \sqrt{2}/2$ $\theta = \pi/4 + 2k\pi$ General



$\theta = 3\pi/4 + 2k\pi$ General

$\theta = \pi/4, 3\pi/4$ Primary

⑥ $2\sin \theta + 1 = 0$ $\theta = 7\pi/6 + 2k\pi$ General

$2\sin \theta = -1$

$\sin \theta = -1/2$

$\theta = 11\pi/6 + 2k\pi$ General



$\theta = 7\pi/6, 11\pi/6$ Primary

⑦ $\cos \theta + 1 = 0$ $\theta = \pi + 2k\pi$ General
 $\cos \theta = -1$



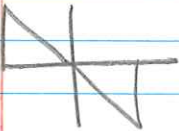
$\theta = \pi$ Primary

⑧ $\tan \theta + 1 = 0$ $\theta = \frac{3\pi}{4} + k\pi$ General
 $\tan \theta = -1$



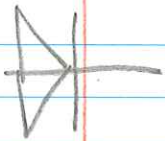
$\theta = \frac{3\pi}{4}, \frac{7\pi}{4}$ Primary

⑨ $\sqrt{3} \cot \theta + 1 = 0$ $\theta = \frac{2\pi}{3} + k\pi$ General
 $\sqrt{3} \cot \theta = -1$



$\cot \theta = -\frac{1}{\sqrt{3}}$ $\theta = \frac{2\pi}{3}, \frac{5\pi}{3}$ Primary

⑩ $4 \sec \theta + 6 = -2$ $\theta = \frac{2\pi}{3} + 2k\pi$ General
 $4 \sec \theta = -8$ $\theta = \frac{4\pi}{3} + 2k\pi$



$\sec \theta = -2$
 $\cos \theta = -\frac{1}{2}$

$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$ Primary

⑪ $5 \csc \theta - 3 = 2$ $\theta = \frac{\pi}{2} + 2k\pi$ General
 $5 \csc \theta = 5$
 $\csc \theta = 1$ $\theta = \frac{\pi}{2}$ Primary
 $\sin \theta = 1$



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⑬ $3\sqrt{2} \cos \theta + 2 = -1$ $\theta = \frac{3\pi}{4} + 2k\pi$ General
 $3\sqrt{2} \cos \theta = -3$ $\theta = \frac{5\pi}{4} + 2k\pi$



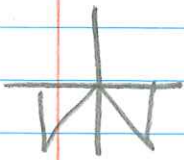
$\cos \theta = \frac{-3}{3\sqrt{2}} = \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$

$\theta = \frac{3\pi}{4}, \frac{5\pi}{4}$ Primary

14) $4\sin\theta + 3\sqrt{3} = \sqrt{3}$

$4\sin\theta = -2\sqrt{3}$

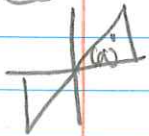
$\sin\theta = \frac{-2\sqrt{3}}{4} = \frac{-\sqrt{3}}{2}$



$\theta = \frac{4\pi}{3} + 2k\pi$ General
 $\theta = \frac{5\pi}{3} + 2k\pi$ General

$\theta = \frac{4\pi}{3}, \frac{5\pi}{3}$ Primary

15) $\tan\frac{\theta}{2} = \sqrt{3}$



$\frac{\theta}{2} = \frac{\pi}{3} + k\pi$

$\theta = \frac{2\pi}{3} + 2k\pi$ General $\theta = \frac{2\pi}{3}$ Primary

k	0	1	2
θ	$\frac{2\pi}{3}$	$\frac{8\pi}{3}$	$\frac{14\pi}{3}$

16) $\cos(2\theta) = \frac{1}{2}$



$2\theta = \frac{2\pi}{3} + 2k\pi$ OR $2\theta = \frac{4\pi}{3} + 2k\pi$

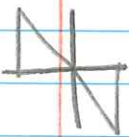
$\theta = \frac{\pi}{3} + k\pi$ OR $\theta = \frac{2\pi}{3} + k\pi$

k	0	1	2
θ	$\frac{\pi}{3}$	$\frac{4\pi}{3}$	$\frac{7\pi}{3}$

k	0	1	2
θ	$\frac{2\pi}{3}$	$\frac{5\pi}{3}$	$\frac{8\pi}{3}$

$\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

17) $\tan(2\theta) = -1$



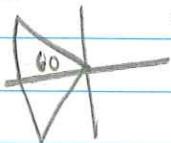
$2\theta = \frac{3\pi}{4} + k\pi$

$\theta = \frac{3\pi}{8} + \frac{k\pi}{2}$

$\theta = \frac{3\pi}{8}, \frac{7\pi}{8}, \frac{11\pi}{8}, \frac{15\pi}{8}$

k	0	1	2	3
θ	$\frac{3\pi}{8}$	$\frac{7\pi}{8}$	$\frac{11\pi}{8}$	$\frac{15\pi}{8}$

18) $\sec\left(\frac{3\theta}{2}\right) = -2$ * $\cos\left(\frac{3\theta}{2}\right) = \frac{-1}{2}$



$\frac{3\theta}{2} = \frac{2\pi}{3} + 2k\pi$

$\frac{3\theta}{2} = \frac{4\pi}{3} + 2k\pi$

$\theta = \frac{4\pi}{9} + \frac{4k\pi}{3}$

$\theta = \frac{8\pi}{9} + \frac{4k\pi}{3}$

$\theta = \frac{4\pi}{9}, \frac{16\pi}{9}, \frac{8\pi}{9}$

k	0	1	2
θ	$\frac{4\pi}{9}$	$\frac{16\pi}{9}$	$\frac{28\pi}{9}$

k	0	1	2
θ	$\frac{8\pi}{9}$	$\frac{20\pi}{9}$	$\frac{32\pi}{9}$

19) $\cot\left(\frac{2\theta}{3}\right) = -\sqrt{3}$ $\tan\left(\frac{2\theta}{3}\right) = \frac{-\sqrt{3}}{3}$



$$\frac{2\theta}{3} = 5\pi/6 + k\pi$$

$$\theta = 5\pi/4 + \frac{3k\pi}{2}$$

k	0	1	2
θ	$5\pi/4$	$11\pi/4$	$17\pi/4$

$$\theta = 5\pi/4$$

20) $\cos(2\theta - \pi/2) = -1$



$$2\theta - \pi/2 = \pi + 2k\pi$$

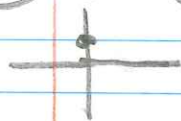
$$2\theta = 3\pi/2 + 2k\pi$$

$$\theta = 3\pi/4 + k\pi$$

k	0	1	2
θ	$3\pi/4$	$7\pi/4$	$11\pi/4$

$$\theta = 3\pi/4, 7\pi/4$$

21) $\sin(3\theta + \pi/8) = 1$



$$3\theta + \pi/8 = \pi/2 + 2k\pi$$

$$3\theta = 4\pi/9 + 2k\pi$$

$$\theta = 4\pi/27 + \frac{2k\pi}{3}$$

k	0	1	2
θ	$4\pi/27$	$22\pi/27$	$40\pi/27$

$$\theta = 4\pi/27, 22\pi/27, 40\pi/27$$

22) $\tan\left(\frac{\theta}{2} + \pi/3\right) = 1$



$$\theta/2 + \pi/3 = \pi/4 + k\pi$$

$$\theta/2 = -\pi/12 + k\pi$$

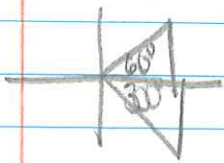
$$\theta = -\pi/6 + 2k\pi$$

$$\theta = 11\pi/6$$

* $[0, 2\pi)$

k	0	1
θ	$11\pi/6$	$11\pi/6$

(23) $\cos\left(\frac{\theta}{3} - \frac{\pi}{4}\right) = \frac{1}{2}$



$$\frac{\theta}{3} - \frac{\pi}{4} = \frac{\pi}{3} + 2k\pi$$

$$\frac{\theta}{3} - \frac{\pi}{4} = \frac{5\pi}{3} + 2k\pi$$

$$\frac{\theta}{3} = \frac{7\pi}{12} + 2k\pi$$

$$\frac{\theta}{3} = \frac{23\pi}{12} + 2k\pi$$

$$\theta = \frac{7\pi}{4} + 6k\pi$$

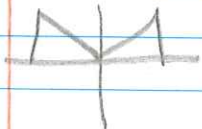
$$\theta = \frac{23\pi}{4} + 6k\pi$$

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

k	0	1	2
θ	$\frac{7\pi}{4}$	$\frac{13\pi}{4}$	$\frac{19\pi}{4}$

k	0	1	2
θ	$\frac{23\pi}{4}$	$\frac{29\pi}{4}$	$\frac{35\pi}{4}$

(24) $\sin = 0.4$



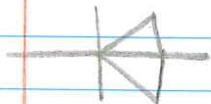
$$\theta = .4115 \text{ or } 23.6^\circ$$

$$\pi - \theta = 2.73 \text{ or } 156.4^\circ$$

(25) $\cos \theta = 0.6$

$$\theta = .93 \text{ or } 53.1^\circ$$

$$2\pi - \theta = 5.35 \text{ or } 306.9^\circ$$



(26) $\tan \theta = 5$

$$\theta = 1.37 \text{ or } 78.7^\circ$$

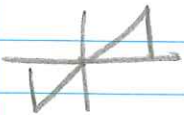
$$\pi + \theta = 4.51 \text{ or } 258.7^\circ$$



(27) $\cot \theta = 2$ $\tan \theta = \frac{1}{2}$

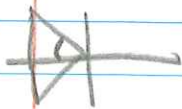
$$\theta = .46 \text{ or } 26.6^\circ$$

$$\pi + \theta = 3.6 \text{ or } 206.6^\circ$$



(28) $\cos \theta = -0.9$

$$\theta = 2.69 \text{ or } 154.2^\circ$$



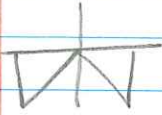
** Ref $\angle = .45$

$$\pi + .45 = 3.59$$

Ref $\angle = 25.8^\circ$

$$\pi + 25.8^\circ = 205.8^\circ$$

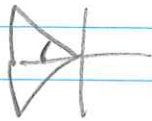
(29) $\sin \theta = -0.2$



$\theta = -0.201 = \overset{\text{IV}}{6.08}$ OR $-11.5^\circ = \overset{\text{IV}}{348.5^\circ}$

$\pi + 0.201 = \overset{\text{III}}{3.34}$ OR $\pi + 11.5^\circ = \overset{\text{III}}{191.5^\circ}$

(30) $\sec \theta = -4$ $\cos \theta = -\frac{1}{4}$



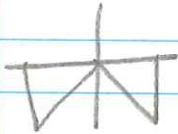
$\theta = 1.82$ OR 104.5°

* Ref $\angle = 1.32$

* Ref $\angle = 75.5^\circ$

$\pi + 1.32 = 4.46$ OR $\pi + 75.5^\circ = 255.5^\circ$

(31) $\csc \theta = -3$ $\sin \theta = -\frac{1}{3}$



$\theta = -0.34 = \overset{\text{IV}}{5.94}$ OR $-19.5^\circ = \overset{\text{IV}}{340.5^\circ}$

$\pi + 0.34 = \overset{\text{III}}{3.48}$ OR $\pi + 19.5^\circ = \overset{\text{III}}{199.5^\circ}$