Do Now:

From the Exercises section of the Solving Quadratic Trig Equations packet #s 1 and 11

Exercises 1–5: Solve for *exact* values of θ in the interval $0° \le \theta \le 360°$.

1. $3\tan^2 \theta - 2 = 1$

$$3\tan^2\theta = 3$$

$$\tan^2\theta = 1$$

$$\tan\theta = \pm 1$$

$$\{45°, 135°, 225°, 315°\}$$

$\tan\theta = 1$

ref $\angle$ 45°

QI $\theta = 45°$

QIII $\theta = 180° + 45° = 225°$

$\tan\theta = -1$

ref $\angle$ 45°

QII $\theta = 180° - 45° = 135°$

QIV $\theta = 360° - 45° = 315°$

Exercises 11–16: Solve for β to the *nearest tenth of a degree* in the interval $0° \le \beta \le 360°$.

11. $5\tan^2 \beta + 3\tan \beta = 2$

$$5\tan^2\beta + 3\tan\beta - 2 = 0$$

$$5\tan^2\beta + 5\tan\beta - 2\tan\beta - 2 = 0$$

$$5\tan\beta(\tan\beta + 1) - 2(\tan\beta + 1) = 0$$

$$(5\tan\beta - 2)(\tan\beta + 1) = 0$$

$\tan\beta = \frac{2}{5}$ $\tan\beta = -1$

ref $\angle$ $\tan^{-1}(\frac{2}{5}) = 21.80...°$ $\beta = 135.0°, 315.0°$

QI $\beta = 21.8°$

QIII $\beta = 201.80..$

$$\{21.8°, 135.0°, 201.8°, 315.0°\}$$

Continue working on #s 3-9 odd and 12-17 all

② $5\cos^2\theta - 1 = 3(1 - \cos^2\theta)$

$5\cos^2\theta - 1 = 3 - 3\cos^2\theta$

$8\cos^2\theta - 4 = 0$

$8\cos^2\theta = 4$

$\cos^2\theta = \frac{1}{2}$

$\cos\theta = \pm\frac{1}{\sqrt{2}} = \frac{\pm\sqrt{2}}{2}$

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

$\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) = 45°$ ref ∡ is 45°

QI $\theta = 45°$ QII $\theta = 180° - 45° = 135°$

QIV $\theta = 360° - 45° = 315°$ QIII $\theta = 180° + 45° = 225°$

$\{45°, 135°, 225°, 315°\}$

④ $\csc^2\theta - 1 = 3$

$\csc^2\theta - 4 = 0$

$(\csc\theta - 2)(\csc\theta + 2) = 0$

$\csc\theta = 2$ $\csc\theta = -2$

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

$\{30°, 150°, 210°, 330°\}$

$\sin^{-1}\left(\frac{1}{2}\right) = 30°$ ref ∡ is 30°

QI $\theta = 30°$ QIII $\theta = 180° + 30° = 210°$

QII $\theta = 180° - 30° = 150°$ QIV $\theta = 360° - 30° = 330°$

⑥ $2\cos^2\theta = \cos\theta + 1$

ac = -2
b = -1

$2\cos^2\theta - \cos\theta - 1 = 0$

$2\cos^2\theta - 2\cos\theta + \cos\theta - 1 = 0$

$\left\{\frac{2\pi}{3}, \frac{4\pi}{3}, 2\pi, 0\right\}$

$2\cos\theta(\cos\theta - 1) + 1(\cos\theta - 1) = 0$

$(2\cos\theta + 1)(\cos\theta - 1) = 0$

Remember ⊖ to
ignore
find ref ∡

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

ref∡: $\cos^{-1}\left(\frac{1}{2}\right) = 60°$ ↑ quadrantal ∡

S | A
T | C

QII $180° - 60° = 120°$ think unit circle

QIII $180° + 60° = 240°$ $0°, 360°$

⑧ $2\sec^2\theta = 3\sec\theta + 2$ $ac = -4$ $b = -3$
    $2\sec^2\theta - 3\sec\theta - 2 = 0$

$2\sec^2\theta - 4\sec\theta + \sec\theta - 2 = 0$
$2\sec\theta(\sec\theta - 2) + 1(\sec\theta - 2) = 0$ $\left\{\dfrac{\pi}{3}, \dfrac{5\pi}{3}\right\}$
$\underline{(2\sec\theta + 1)(\sec\theta - 2)} = 0$
$\sec\theta = -\dfrac{1}{2}$ | $\sec\theta = 2$
                            | $\cos\theta = \dfrac{1}{2}$ S | Ⓐ
$\cos\theta = -2$ | T | Ⓒ
      ∅
                    $\cos^{-1}\left(\dfrac{1}{2}\right) = 60°$
                    QI $\theta = 60°$
                    QIV $\theta = 360° - 60° = 300°$

⑩ $(\sin\theta)^2 = \left(\sqrt{\sin\theta}\right)^2$
    $\sin^2\theta = \sin\theta$
    $\sin^2\theta - \sin\theta = 0$
    $\sin\theta(\sin\theta - 1) = 0$
    $\sin\theta = 0$ $\sin\theta = 1$ * unit circle
    $0°, 180°, 360°$ $90°$

        $\left\{0, \dfrac{\pi}{2}, \pi, 2\pi\right\}$