Exercises 1–6: Solve for exact values of θ in the interval $0° \leq \theta \leq 360°$.

$\{30°, 210°\}$

5 $6\left(\cot\theta - \dfrac{\sqrt{3}}{2}\right) = 5\cot\theta - 2\sqrt{3}$

let $\cot\theta = X$

$6\left(X - \dfrac{\sqrt{3}}{2}\right) = 5X - 2\sqrt{3}$

$6X - 3\sqrt{3} = 5X - 2\sqrt{3}$

$X = \sqrt{3}$

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

$\tan\theta = \dfrac{1}{\sqrt{3}}$ or $\dfrac{\sqrt{3}}{3}$

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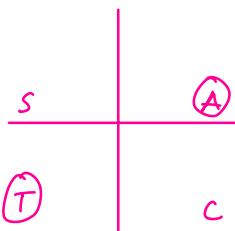
rf ∤ 30°

QI $\theta = 30°$

QIII $\theta = 180° + 30° = 210°$

Continuing from Thursday…

Name:_____   Date:_____
PC: Solving First Degree Trig Equations   Ms. Loughran

Examples:

1. Solve for θ, to the nearest degree in the interval $0° \leq \theta \leq 360°$.

$$3\tan\theta - 4 = 5\tan\theta - 1$$

let $\tan\theta = X$

$3X - 4 = 5X - 1$

$-3 = 2X$

$-\dfrac{3}{2} = X$

$\tan\theta = -\dfrac{3}{2}$

ref ∤ $\tan^{-1}\left(\dfrac{3}{2}\right) = 56.309\ldots°$

↗ ignore the θ
to find the rf ∤

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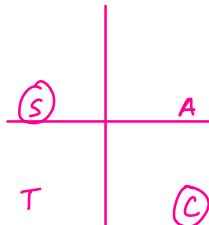
QII $\theta = 180° - 56.309\ldots° = 123.690\ldots°$

QIV $\theta = 360° - 56.309\ldots° = 303.690\ldots°$

$\{124°, 304°\}$

4. Solve for θ to the nearest degree in the interval $0° \le \theta \le 360°$

$$3(\sin\theta - 1) = -4$$

let $\sin\theta = x$

$$3(x-1) = -4$$
$$3x - 3 = -4$$
$$3x = -1$$
$$x = -\frac{1}{3}$$

$$\{199°, 341°\}$$

$$\sin\theta = -\frac{1}{3}$$

ref $\angle$: $\sin^{-1}\left(\frac{1}{3}\right) = 19.471\ldots°$

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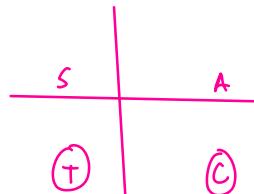
QIII : $180° + 19.47\ldots° = 199.471\ldots°$

QIV : $360° - 19.47\ldots° = 340.528\ldots°$

6. Solve for θ to the nearest degree in the interval $0° \le \theta \le 360°$

$$4\cos\theta = \cos\theta + 2$$
$$\underline{-\cos\theta \quad -\cos\theta}$$

$$3\cos\theta = 2$$
$$\cos\theta = \frac{2}{3}$$

ref $\angle$ $\cos^{-1}\left(\frac{2}{3}\right) = 48.189\ldots°$

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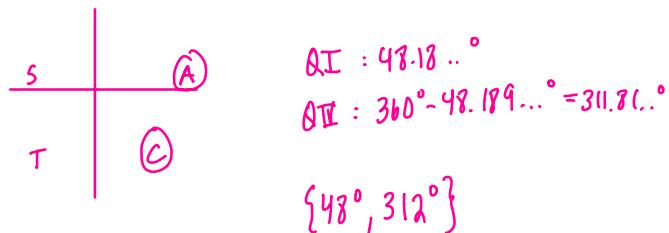
QI : $48.18\ldots°$

QIV : $360° - 48.189\ldots° = 311.81\ldots°$

$$\{48°, 312°\}$$

8. For $0° \leq \theta \leq 360°$, solve : $|2\cos\theta - 3| = 5$

let $X = \cos\theta$

$|2X - 3| = 5$

$*$ Remember back to the geometric definition of absolute value

$2|X - \frac{3}{2}| = 5$

$|X - \frac{3}{2}| = \frac{5}{2}$

X's distance from $\frac{3}{2} = \frac{5}{2}$

$$\frac{-2}{2} \quad \frac{3}{2} \quad \frac{8}{2}$$
$$-1 \qquad \qquad 4$$
$$\frac{5}{2}$$
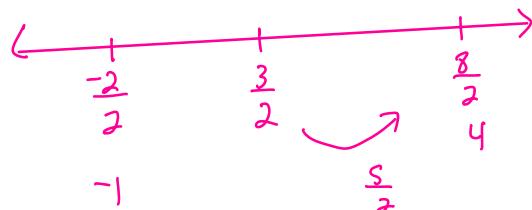
$X = -1, 4$

whenever sine or cosine $= \pm 1, 0$ go to the unit circle

(0,1) (-1,0) (1,0) (0,-1)

$\cos\theta = -1$

$\theta = 180°$

$\cos\theta = 4$

$\cos^{-1}(4)$ error

there is no θ with a cosine of 4

$*$
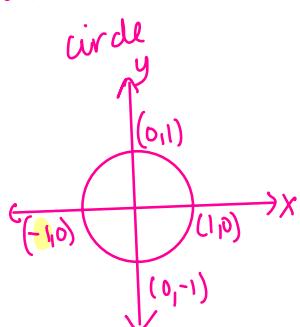
$* \quad -1 \leq \cos\theta \leq 1$

$-1 \leq \sin\theta \leq 1$

$\{180°\}$

$\tan\theta$ is not contained b/w -1 and 1