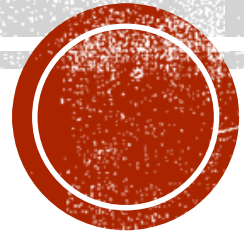
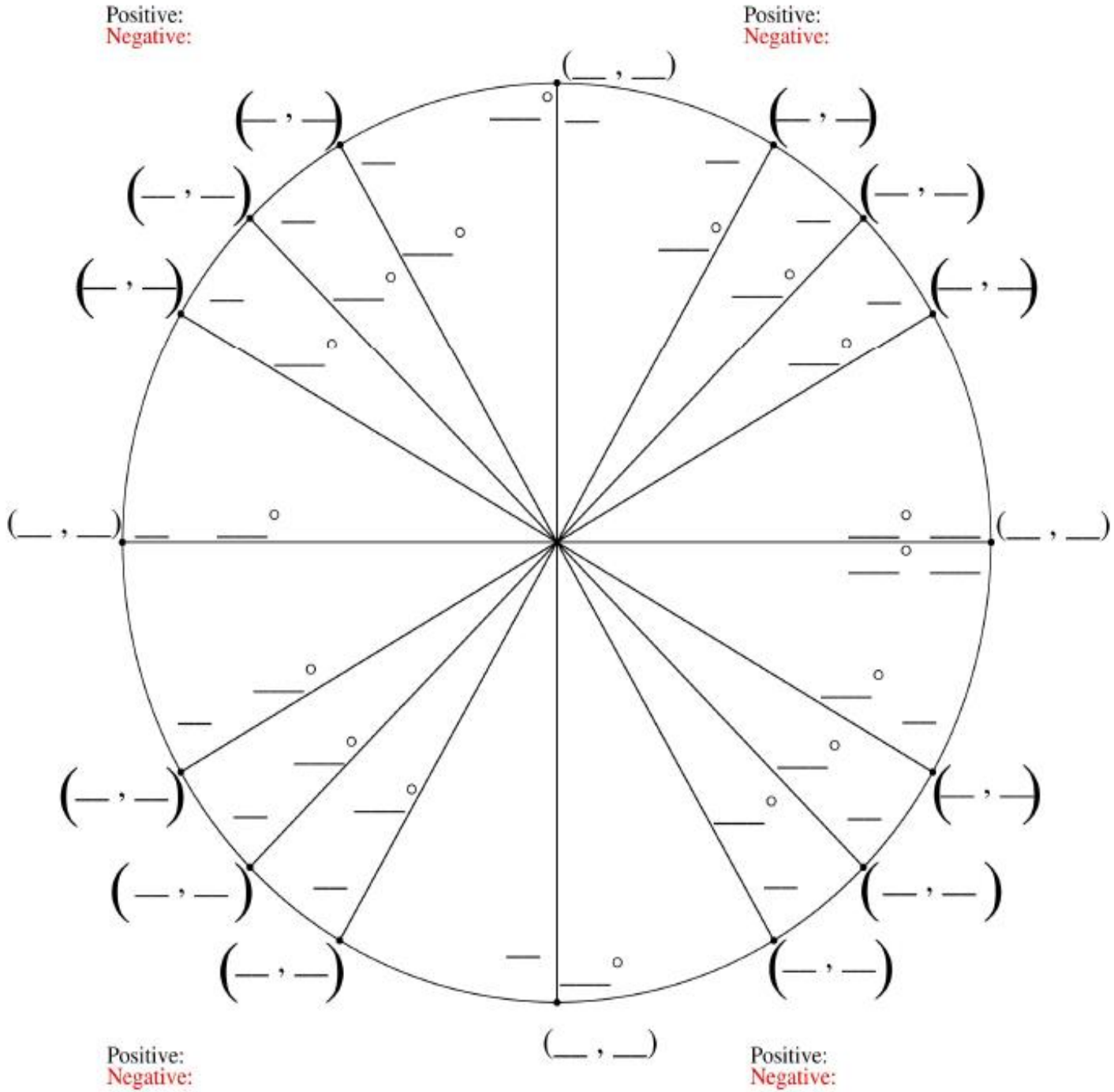
UNIT CIRCLE

Honors Calculus

Keeper 8

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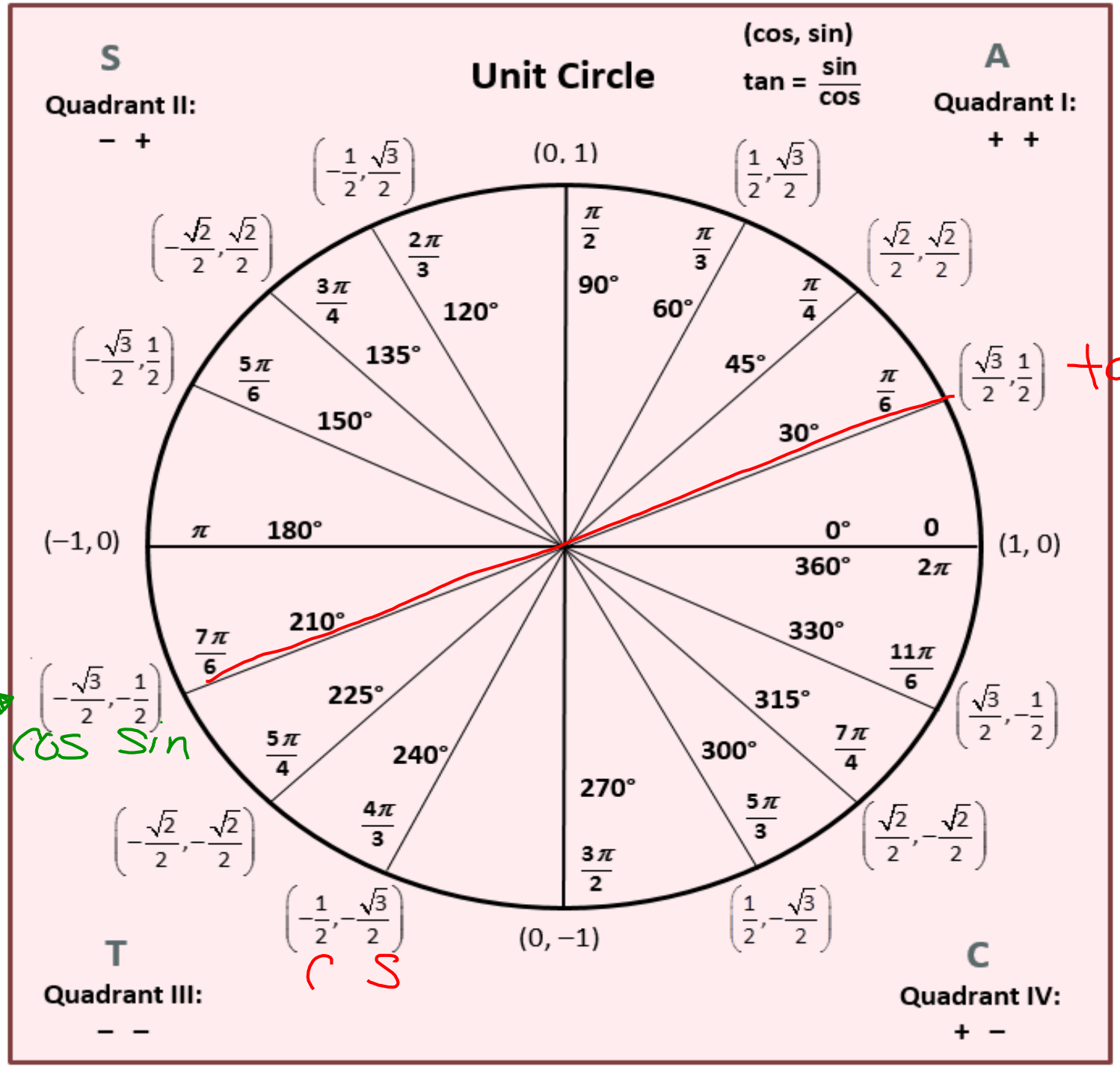

tan = √3/3

tan = √3/3

cos sin

r s

FIND THE EXACT VALUE OF THE TRIG FUNCTION

1. $\cos\left(\frac{4\pi}{3}\right)$

$\frac{4\pi}{3} \rightarrow \left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ cos, sin

$-1/2$

2. $\tan 210°$

$210° \quad \left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ C, S

$-\frac{1}{2} \div -\frac{\sqrt{3}}{2} = -\frac{1}{2} \cdot -\frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}}\frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

3. $\csc \frac{11\pi}{6}$

reciprocal of sin

$\frac{11\pi}{6} \rightarrow \left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ C, S

$\sin\frac{11\pi}{6} = -\frac{1}{2}$

-2

FIND THE EXACT VALUE OF THE TRIG FUNCTION

4. $sec(270°)$ → reciprocal of cos

$(0, -1)$ (C, S)

$\frac{0}{1}$ ↔ $\frac{1}{0}$

Undefined or DNE

5. $sin(-120°)$

$+360°$

$sin(240°) = -\frac{\sqrt{3}}{2}$

6. $cot\left(\frac{17\pi}{6}\right)$

$\frac{17\pi}{6} - 2\pi$

$\frac{17\pi}{6} - \frac{12\pi}{6} = \frac{5\pi}{6}$

C S

$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

$-\frac{\sqrt{3}}{2} \div \frac{1}{2} = -\frac{\sqrt{3}}{2} \cdot \frac{2}{1} = -\sqrt{3}$

Trigonometric Identities

Reciprocal Identities

$$\cot\theta = \frac{1}{\tan\theta}$$

$$\csc\theta = \frac{1}{\sin\theta}$$

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

Quotient Identities

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

$$\cot\theta = \frac{\cos\theta}{\sin\theta}$$

Pythagorean Identities

$$\sin^2\theta + \cos^2\theta = 1$$

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

$$1 + \cot^2\theta = \csc^2\theta$$

- Know these basic identities
- Be able to rearrange the Pythagorean identities for various trig functions.

SOLVE THE TRIG EQUATION. GIVE YOUR ANSWERS IN RADIANS $(0 \leq \theta < 2\pi)$

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

like $2x-1=0$

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

means inverse

"I need to find an angle whose cosine is 1/2"

$\theta = \cos^{-1}\left(\frac{1}{2}\right)$

$\theta = \frac{\pi}{3} + \frac{5\pi}{3}$

2. $\frac{4\sin^2\theta}{4} = \frac{3}{4}$

$4|x^2=3$

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

$\sin\theta = \pm\frac{\sqrt{3}}{2}$

$\theta = \sin^{-1}\left(\pm\frac{\sqrt{3}}{2}\right)$

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

3. $2\sin^2\theta - \sin\theta = 3$

$2\sin^2\theta - \sin\theta - 3 = 0$

$(2\sin\theta - 3)(\sin\theta + 1) = 0$

$2\sin\theta - 3 = 0$ $\quad \sin\theta + 1 = 0$

~~$\sin\theta = \frac{3}{2}$~~ $\quad \sin\theta = -1$

$\theta = \sin^{-1}(-1)$

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

$2x^2 - x = 3$

$2x^2 - x - 3 = 0$

$(2x - 3)(x + 1) = 0$

4. $2\sin^2\theta = \cos\theta - 1$

Pyth. id
$\sin^2\theta + \cos^2\theta = 1$
$\sin^2\theta = 1 - \cos^2\theta$

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

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

$0 = 2\cos^2\theta + \cos\theta - 3$

$0 = (2\cos\theta + 3)(\cos\theta - 1)$

$2\cos\theta + 3 = 0$

$\cos\theta = -3/2$

$\cos\theta - 1 = 0$

$\cos\theta = 1$

$\theta = 0$

$2(1-x^2) = x - 1$