degrees

90° 120° 60° 135° 45° 150° 30°

radians

$\frac{\pi}{2}$ $\frac{2\pi}{3}$ $\frac{\pi}{3}$ $\frac{3\pi}{4}$ $\frac{\pi}{4}$ $\frac{5\pi}{6}$ $\frac{\pi}{6}$
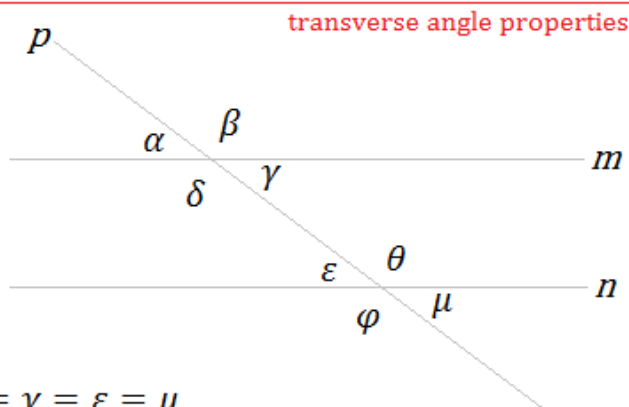
degrees to radians: multiply by $\frac{\pi}{180}$

radians to degrees: multiply by $\frac{180}{\pi}$

$$10° = \frac{\pi}{18} \qquad 15° = \frac{\pi}{12} \qquad 18° = \frac{\pi}{10} \qquad 20° = \frac{\pi}{9} \qquad 36° = \frac{\pi}{5} \qquad 54° = \frac{3\pi}{10} \qquad 72° = \frac{2\pi}{5} \qquad 108° = \frac{3\pi}{5}$$

transverse angle properties

p, α, β, γ, δ ... m

ε, θ, μ, φ ... n

$$\alpha = \gamma = \varepsilon = \mu$$

$$\beta = \delta = \theta = \varphi \qquad m \| n$$

$$\alpha + \beta = 180°$$

right triangle properties

$$a^2 + b^2 = c^2 \qquad \sigma + \omega = 90°$$

$$\sin\sigma = \frac{b}{c} \qquad \cos\sigma = \frac{a}{c} \qquad \tan\sigma = \frac{b}{a}$$

$$\sin\omega = \frac{a}{c} \qquad \cos\omega = \frac{b}{c} \qquad \tan\omega = \frac{a}{b}$$

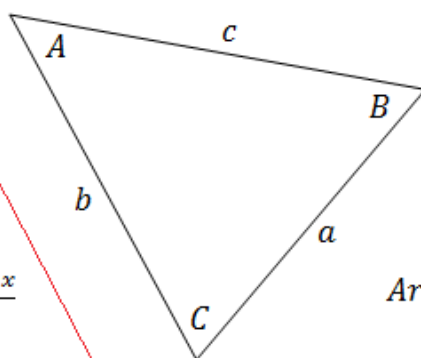$$\sin\sigma = \cos\omega \qquad \cos\sigma = \sin\omega \qquad \tan\sigma = \frac{1}{\tan\omega}$$
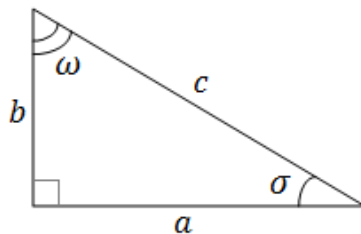
general triangle properties

$$A + B + C = 180°$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$Area = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2}$$

$$Area = \tfrac{1}{2}ab\sin C = \tfrac{1}{2}ac\sin B = \tfrac{1}{2}bc\sin A$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$b^2 = a^2 + c^2 - 2ac\cos B$$

$$c^2 = a^2 + b^2 - 2ab\cos C$$

general trig properties

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

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y} \qquad \tan\frac{x}{2} = \frac{1-\cos x}{\sin x}$$

$$\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y \qquad \left(\sin\frac{x}{2}\right)^2 = \frac{1}{2} - \frac{1}{2}\cos x$$

$$\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y \qquad \left(\cos\frac{x}{2}\right)^2 = \frac{1}{2} + \frac{1}{2}\cos x$$

$$\cos 2x = 2\cos^2 x - 1 = \cos^2 x - \sin^2 x = 1 - 2\sin^2 x$$

$$\sin 2x = 2\sin x \cos x \qquad \tan 2x = \frac{2\tan x}{1 - \tan^2 x}$$

$$\sin 3x = 3\sin x - 4\sin^3 x \qquad \cos 3x = 4\cos^3 x - 3\cos x$$

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

$$\tan^2 x + 1 = \frac{1}{\cos^2 x}$$

$$\tan x \tan\frac{x}{2} + 1 = \frac{1}{\cos x}$$