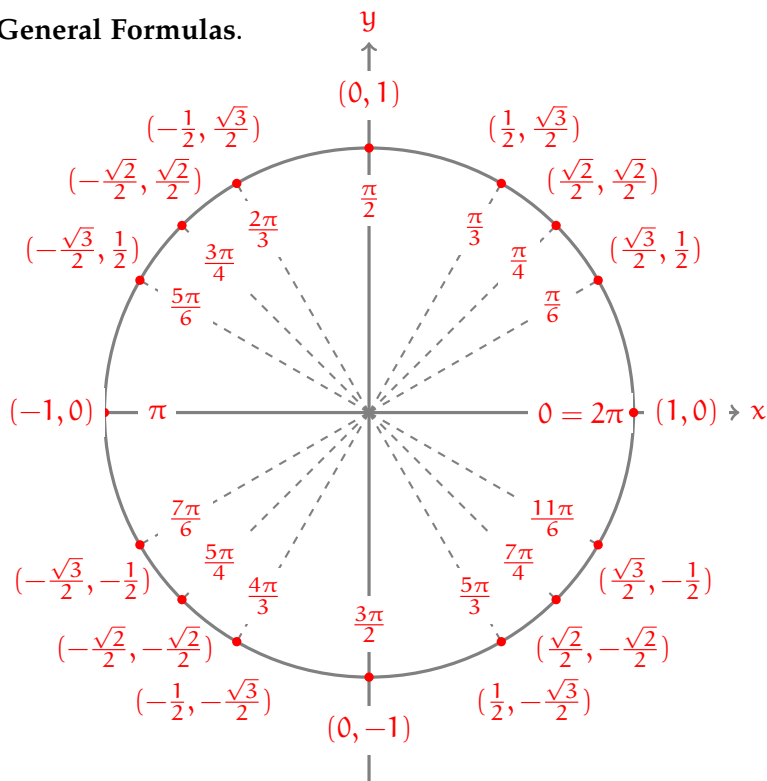


General Formulas.**A1 Formulas.**

- products and lengths and angles:
 - $\mathbf{v} \cdot \mathbf{w} = \|\mathbf{v}\| \|\mathbf{w}\| \cos \theta$ ◦ $\|\mathbf{v} \times \mathbf{w}\| = \|\mathbf{v}\| \|\mathbf{w}\| \sin \theta$
- projection and scalar component:
 - $\text{proj}_{\mathbf{v}}(\mathbf{w}) = \left(\frac{\mathbf{v} \cdot \mathbf{w}}{\mathbf{v} \cdot \mathbf{v}} \right) \mathbf{v}$ ◦ $\text{comp}_{\mathbf{v}}(\mathbf{w}) = \frac{\mathbf{v} \cdot \mathbf{w}}{\|\mathbf{v}\|}$
- scalar triple product:
 - $\mathbf{v} \cdot (\mathbf{w} \times \mathbf{r}) = \mathbf{r} \cdot (\mathbf{v} \times \mathbf{w}) = \mathbf{w} \cdot (\mathbf{r} \times \mathbf{v})$

A2 Formulas.

- distance from point X to plane \mathcal{P} with normal \mathbf{n} :
 - $\frac{|\mathbf{AX} \cdot \mathbf{n}|}{\|\mathbf{n}\|}$ where A is on \mathcal{P}
- distance from point X and to line ℓ with direction \mathbf{v} :
 - $\frac{\|\mathbf{AX} \times \mathbf{v}\|}{\|\mathbf{v}\|}$ where A is on ℓ
- distance between non-parallel lines ℓ_1 and ℓ_2 :
 - $\frac{|\mathbf{AB} \cdot \mathbf{n}|}{\|\mathbf{n}\|}$ where A is on ℓ_1 , B is on ℓ_2 , \mathbf{n} is common normal