

Trigonometrische Formeln

$$1.) \quad \sin^2 p + \cos^2 p = 1; \quad \operatorname{tang} p \cdot \operatorname{ctg} p = 1; \quad \sec p \cdot \cos p = 1 \quad (\text{T-1})$$

$$2.) \quad \operatorname{cosec} p \cdot \sin p = 1, \quad \sec^2 p - \operatorname{tg}^2 p = 1; \quad \operatorname{cosec}^2 p - \operatorname{ctg}^2 p = 1 \quad (\text{T-2})$$

$$3.) \quad \sin \operatorname{vers} p + \cos p = 1; \quad \cos \operatorname{vers} p + \sin p = 1 \quad (\text{T-3})$$

$$4.) \quad \sin p = \sqrt{1 - \cos^2 p} = \frac{\operatorname{tg} p}{\sqrt{1 + \operatorname{tg}^2 p}} = \frac{1}{\sqrt{1 + \operatorname{ctg}^2 p}} =$$

$$\frac{\sqrt{\sec^2 p - 1}}{\sec p} = \frac{1}{\operatorname{cosec} p} = \cos p \operatorname{tg} p \quad (\text{T-4})$$

$$5.) \quad \cos p = \sqrt{1 - \sin^2 p} = \frac{1}{\sqrt{1 + \operatorname{tg}^2 p}} = \frac{\operatorname{ctg} p}{\sqrt{1 + \operatorname{ctg}^2 p}} =$$

$$\frac{1}{\sec p} = \frac{\sqrt{\operatorname{cosec}^2 p - 1}}{\operatorname{cosec} p} = \sin p \cdot \operatorname{ctg} p. \quad (\text{T-5})$$

$$6.) \quad \operatorname{tg} p = \frac{\sin p}{\sqrt{1 - \sin^2 p}} = \frac{\sqrt{1 - \cos^2 p}}{\cos p} = \frac{1}{\operatorname{cotg} p} =$$

$$\frac{\sqrt{\sec^2 p - 1}}{\sec p} = \frac{1}{\sqrt{\operatorname{cosec}^2 p - 1}}. \quad (\text{T-6})$$

$$7.) \quad \operatorname{cotg} p = \frac{\sqrt{1 - \sin^2 p}}{\sin p} = \frac{\cos p}{\sqrt{1 - \cos^2 p}} = \frac{1}{\operatorname{tang} p} =$$

$$\frac{1}{\sqrt{\sec^2 p - 1}} = \sqrt{\operatorname{cosec}^2 p - 1}. \quad (\text{T-7})$$

$$8.) \quad \sec p = \frac{1}{\sqrt{1 + \sin^2 p}} = \frac{1}{\cos p} = \sqrt{1 + \operatorname{tg}^2 p} =$$

$$\frac{\sqrt{1 + \operatorname{ctg}^2 p}}{\operatorname{ctg} p} = \frac{\operatorname{cosec} p}{\sqrt{\operatorname{cosec}^2 p - 1}} = \frac{\operatorname{tg} p}{\sin p}. \quad (\text{T-8})$$

$$9.) \quad \operatorname{cosec} p = \frac{1}{\sin p} = \frac{1}{\sqrt{1 - \cos^2 p}} = \frac{\sqrt{1 + \operatorname{tg}^2 p}}{\operatorname{tg} p} = \quad (\text{T-9})$$

$$\sqrt{1 + \operatorname{ctg}^2 p} = \frac{\sec p}{\sqrt{\sec^2 p - 1}} = \frac{\operatorname{ctg} p}{\cos p}.$$

$$10.) \quad \sin \operatorname{vers} p = 1 - \cos p = 2 \sin^2 \frac{p}{2} \quad (\text{T-10})$$

$$11.) \quad \cos \operatorname{vers} p = 1 - \sin p = 2 \sin^2(45^\circ - \frac{p}{2}) \quad (\text{T-11})$$

$$12.) \quad \sin \frac{p}{2} = \sqrt{\frac{1}{2} - \frac{1}{2} \cos p}; \quad \cos \frac{1}{2} p = \sqrt{\frac{1}{2} + \frac{1}{2} \cos p} \quad (\text{T-12})$$

$$13.) \quad \operatorname{tg} \frac{1}{2} p = \frac{\sin p}{1 + \cos p}; \quad \operatorname{ctg} \frac{1}{2} p = \frac{\sin p}{1 - \cos p}. \quad (\text{T-13})$$

$$14.) \quad \sin p + \cos p = \sqrt{1 + \sin 2p} = \cos(45^\circ - p) \cdot \sqrt{2} \quad (\text{T-14})$$

$$15.) \quad \cos p - \sin p = \sqrt{1 - \sin 2p} = \sin(45^\circ - p) \cdot \sqrt{2} \quad (\text{T-15})$$

$$16.) \quad \operatorname{tg} p + \operatorname{ctg} p = 2 \operatorname{cosec} 2p; \quad \operatorname{ctg} p - \operatorname{tg} p = 2 \operatorname{ctg} 2p \quad (\text{T-16})$$