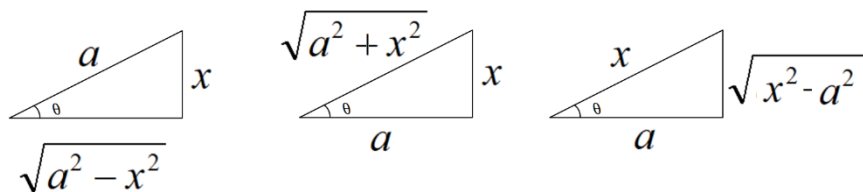


Integração por substituição trigonométrica



$$\sin \theta = \frac{x}{a}$$

$$x = a \sin \theta$$

$$dx = a \cos \theta d\theta$$

$$\operatorname{tg} \theta = \frac{x}{a}$$

$$x = a \operatorname{tg} \theta$$

$$dx = a \sec^2 \theta d\theta$$

$$\cos \theta = \frac{a}{x}$$

$$x = a \sec \theta$$

$$dx = a \sec \theta \operatorname{tg} \theta d\theta$$

$$\int \frac{1}{x^2 \sqrt{16-x^2}} dx$$

$$a = 4$$

$$x = 4 \sin \theta$$

$$dx = 4 \cos \theta d\theta$$

$$\int \frac{1}{16 \sin^2 \theta \sqrt{16-16 \sin^2 \theta}} 4 \cos \theta d\theta$$

$$\int \frac{1}{16 \sin^2 \theta \sqrt{16(1-\sin^2 \theta)}} 4 \cos \theta d\theta$$

$$\int \frac{1}{16 \sin^2 \theta \cdot 4 \sqrt{\cos^2 \theta}} 4 \cos \theta d\theta$$

$$\int \frac{1}{16 \sin^2 \theta \cdot 4 \cos \theta} 4 \cos \theta d\theta$$

$$\frac{1}{16} \int \frac{1}{\sin^2 \theta} d\theta = \frac{1}{16} \int \operatorname{cosec}^2 \theta d\theta = \frac{1}{16} (-\cot \theta) + C$$

$$\int \frac{1}{x^2 \sqrt{16-x^2}} dx = \frac{1}{16} (-\cot \theta) + C = -\frac{\sqrt{16-x^2}}{16x} + C$$