

Usando las definiciones y relaciones entre las distintas funciones trigonométricas, así como la identidad fundamental: $\text{sen}^2 \alpha + \text{cos}^2 \alpha = 1$, demostrar las siguientes identidades trigonométricas:

$$1) \frac{\text{cos}^2 \alpha}{1 - \text{sen} \alpha} = 1 + \text{sen} \alpha$$

$$2) \text{sec} \alpha - \text{sec} \alpha \cdot \text{sen}^2 \alpha = \text{cos} \alpha$$

$$3) \text{sen} \alpha \cdot \text{sec} \alpha \cdot \text{cotan} \alpha = 1$$

$$4) \text{sen}^2 \alpha \cdot (1 + \text{cotan}^2 \alpha) = 1$$

$$5) \text{sen}^2 \alpha \cdot \text{sec}^2 \alpha - \text{sec}^2 \alpha = -1$$

$$6) (\text{sen} \alpha + \text{cos} \alpha)^2 + (\text{sen} \alpha - \text{cos} \alpha)^2 = 2$$

$$7) \tan \alpha + \frac{\text{cos} \alpha}{1 + \text{sen} \alpha} = \text{sec} \alpha$$

$$8) \tan^2 \alpha \cdot \text{cos}^2 \alpha + \text{cotan}^2 \alpha \cdot \text{sen}^2 \alpha = 1$$

$$9) \frac{1 - \text{sen} \alpha}{\text{cos} \alpha} = \frac{\text{cos} \alpha}{1 + \text{sen} \alpha}$$

$$10) \text{sec}^2 \alpha \cdot \text{cosec}^2 \alpha = \text{sec}^2 \alpha + \text{cosec}^2 \alpha$$

$$11) 2 \cdot \text{cosec} \alpha = \frac{\text{sen} \alpha}{1 + \text{cos} \alpha} + \frac{1 + \text{cos} \alpha}{\text{sen} \alpha}$$

$$12) \text{sec}^4 \alpha - \text{sec}^2 \alpha = \tan^4 \alpha + \tan^2 \alpha$$

$$13) \frac{\text{sec} \alpha - \text{cosec} \alpha}{\text{sec} \alpha + \text{cosec} \alpha} = \frac{\tan \alpha - 1}{\tan \alpha + 1}$$

$$14) \frac{\tan \alpha - \text{sen} \alpha}{\text{sen}^3 \alpha} = \frac{\text{sec} \alpha}{1 + \text{cos} \alpha}$$

$$15) \frac{\text{sen} \alpha - \text{cos} \alpha + 1}{\text{sen} \alpha + \text{cos} \alpha - 1} = \frac{\text{sen} \alpha + 1}{\text{cos} \alpha}$$

$$16) \frac{\text{cos} \alpha \cdot \text{cotan} \alpha - \text{sen} \alpha \cdot \tan \alpha}{\text{cosec} \alpha - \text{sec} \alpha} = 1 + \text{sen} \alpha \cdot \text{cos} \alpha$$

$$17) \frac{\tan \alpha + \text{sec} \alpha - 1}{\tan \alpha - \text{sec} \alpha + 1} = \tan \alpha + \text{sec} \alpha$$

$$18) \text{sen} \alpha \cdot \text{sec} \alpha = \tan \alpha$$

$$19) \frac{\text{sen} \alpha}{\text{cosec} \alpha} + \frac{\text{cos} \alpha}{\text{sec} \alpha} = 1$$

$$20) (1 - \text{cos} \alpha) \cdot (1 + \text{sec} \alpha) \cdot \text{cotan} \alpha = \text{sen} \alpha$$

$$21) 1 - \frac{\text{cos}^2 \alpha}{1 + \text{sen} \alpha} = \text{sen} \alpha$$

$$22) \tan^2 \alpha \cdot \text{cosec}^2 \alpha \cdot \text{cotan}^2 \alpha \cdot \text{sen}^2 \alpha = 1$$

$$23) \tan \alpha \cdot \text{sen} \alpha + \text{cos} \alpha = \text{sec} \alpha$$

$$24) \frac{1}{1 - \text{sen} \alpha} + \frac{1}{1 + \text{sen} \alpha} = 2 \cdot \text{sec}^2 \alpha$$

$$25) \frac{\text{sen} \alpha}{\text{sen} \alpha + \text{cos} \alpha} = \frac{\text{sec} \alpha}{\text{sec} \alpha + \text{cosec} \alpha}$$

$$26) \frac{\text{sec} \alpha + \text{cosec} \alpha}{\tan \alpha + \text{cotan} \alpha} = \text{sen} \alpha + \text{cos} \alpha$$

$$27) \text{cotan} \alpha + \frac{\text{sen} \alpha}{1 + \text{cos} \alpha} = \text{cosec} \alpha$$

$$28) (1 - \text{sen}^2 \alpha) \cdot (1 + \tan^2 \alpha) = 1$$

$$29) \text{cosec}^2 \alpha \cdot (1 - \text{cos}^2 \alpha) = 1$$

$$30) \frac{1 - 2 \cdot \text{cos}^2 \alpha}{\text{sen} \alpha \cdot \text{cos} \alpha} = \tan \alpha - \text{cotan} \alpha$$

$$31) \text{sen} \alpha \cdot \text{cos} \alpha \cdot (\tan \alpha + \text{cotan} \alpha) = 1$$

$$32) \frac{1}{\text{sec} \alpha + \tan \alpha} = \text{sec} \alpha - \tan \alpha$$

$$33) \frac{1 - \text{cos} \alpha}{1 + \text{cos} \alpha} = \frac{\text{sec} \alpha - 1}{\text{sec} \alpha + 1}$$

$$34) \frac{\text{sec} \alpha - 1}{\text{sec} \alpha + 1} = (\text{cotan} \alpha - \text{cosec} \alpha)^2$$