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

1) $\dfrac{\cos^2\alpha}{1-\operatorname{sen}\alpha} = 1 + \operatorname{sen}\alpha$

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

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

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

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

6) $\left(\operatorname{sen}\alpha + \cos\alpha\right)^2 + \left(\operatorname{sen}\alpha - \cos\alpha\right)^2 = 2$

7) $\tan\alpha + \dfrac{\cos\alpha}{1+\operatorname{sen}\alpha} = \sec\alpha$

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

9) $\dfrac{1-\operatorname{sen}\alpha}{\cos\alpha} = \dfrac{\cos\alpha}{1+\operatorname{sen}\alpha}$

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

11) $2 \cdot \operatorname{cosec}\alpha = \dfrac{\operatorname{sen}\alpha}{1+\cos\alpha} + \dfrac{1+\cos\alpha}{\operatorname{sen}\alpha}$

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

13) $\dfrac{\sec\alpha - \operatorname{cosec}\alpha}{\sec\alpha + \operatorname{cosec}\alpha} = \dfrac{\tan\alpha - 1}{\tan\alpha + 1}$

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

15) $\dfrac{\operatorname{sen}\alpha - \cos\alpha + 1}{\operatorname{sen}\alpha + \cos\alpha - 1} = \dfrac{\operatorname{sen}\alpha + 1}{\cos\alpha}$

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

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

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

19) $\dfrac{\operatorname{sen}\alpha}{\operatorname{cosec}\alpha} + \dfrac{\cos\alpha}{\sec\alpha} = 1$

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

21) $1 - \dfrac{\cos^2\alpha}{1+\operatorname{sen}\alpha} = \operatorname{sen}\alpha$

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

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

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

25) $\dfrac{\operatorname{sen}\alpha}{\operatorname{sen}\alpha + \cos\alpha} = \dfrac{\sec\alpha}{\sec\alpha + \operatorname{cosec}\alpha}$

26) $\dfrac{\sec\alpha + \operatorname{cosec}\alpha}{\tan\alpha + \operatorname{cotan}\alpha} = \operatorname{sen}\alpha + \cos\alpha$

27) $\operatorname{cotan}\alpha + \dfrac{\operatorname{sen}\alpha}{1+\cos\alpha} = \operatorname{cosec}\alpha$

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

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

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

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

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

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

34) $\dfrac{\sec\alpha - 1}{\sec\alpha + 1} = \left(\operatorname{cotan}\alpha - \operatorname{cosec}\alpha\right)^2$