Precalculus

Name_____

Simplify the following trig expressions completely:

1. $\dfrac{\tan^2 x+1}{1+\cot^2 x}$

2. $\dfrac{1}{\sec x-\tan x}-\dfrac{1}{\sec x+\tan x}$

3. sec x tan x cos x

4. $\sin^2$ x cot x csc x

5. $\dfrac{1-\cos^2 t}{\sin^2 t}$

6. $\dfrac{\tan^2 x}{1-\sec^2 x}$

7. $\tan^2$ x ($\csc^2$ x – 1)

8. $\dfrac{\cos^2 x}{1-\cos^2 x}$

9. $\dfrac{\sec^2 x-1}{\tan x}$

10. $\dfrac{\cos^2 x-1}{\sin^2 x-1}$

11. cos x (sec x – cos x)

12. cot x (tan x + cot x)

13. $\dfrac{\tan x+\cot x}{\cot x}$

14. $\dfrac{\tan x}{\tan x+\cot x}$

15. sec x cot x – cot x cos x

16. sin x tan x – csc x tan x

17. $\dfrac{\cot^2 x\cos^2 x}{\cot^2 x-\cos^2 x}$

18. $\dfrac{\sin^2 x-\tan^2 x}{\tan^2 x\sin^2 x}$

19. $\dfrac{(\sin x+\tan x)^2+\cos^2 x-\sec^2 x}{\tan x}$

20. $\dfrac{2\sin x\cos x+(\sin x-\cos x)^2}{\sec x}$

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21. $\dfrac{\sin x(1+\sin x)}{1-\cos^2 x}-1$

22. $\dfrac{1-\tan^2 x}{1+\tan^2 x}+1$

23. $\dfrac{\tan x-\tan x\sin^2 x}{2\sin x\cos x}$

24. $\dfrac{\sec x-\cos x}{3\tan x\sin x}$

25. $\dfrac{\sin^3 x+\cos^3 x}{1-\sin x\cos x}$

26. $\dfrac{\cos^3 x+\sin^3 x}{(\cos x+\sin x)^2}$

(1) $\frac{\sec^2\theta}{\csc^2\theta} \quad \frac{1}{\cos^2} \cdot \frac{\sin^2}{1} = \frac{\sin^2}{\cos^2} = \tan^2\theta$

(2) $\frac{1}{\sec x - \tan x} - \frac{1}{\sec x + \tan x} \quad \frac{\sec x + \tan x - \sec x + \tan x}{\sec^2 - \tan^2 x}$

common denom is both

$\frac{2\tan x}{\sec^2 - \tan^2 x}$ (1)

$2\tan x$

(3) $\frac{1}{\cos} \cdot \frac{\sin}{\cos} \cdot \frac{\cos}{1} \quad \frac{\sin}{\cos} = \tan\theta$

(4) $\frac{\sin^2}{1} \cdot \frac{\cos}{\sin} \cdot \frac{1}{\sin} \quad \cos\theta$

(5) $\frac{\sin^2 t}{\sin^2 t} = 1$

(6) -1

(7) $\tan^2\left(\frac{1}{\tan^2}\right) = 1$ ($\cot^2$)

(8) $\frac{\cos^2}{\sin^2} = \cot^2\theta$

9) $\frac{\tan^2}{\tan} = \tan\theta$

10) $\tan^2\theta \leftarrow \left(\frac{-\sin^2}{-\cos^2}\right)$

11) $\cos x \frac{1}{\cos}$ $\quad 1-\cos^2\theta = \sin^2\theta$

$\cos(\sec) - \cos^2$

12) $1 + \cot^2\theta = \csc^2\theta$

13) $\frac{\tan x}{\cot x} + 1 =$

$\tan \cdot$

$\tan^2 + 1 = \sec^2$

14) $1 + \tan \cdot \frac{\sin}{\cos} = 1 + \tan^2 = \sec^2\theta$

15) $\frac{1}{\cos} \cdot \frac{\cos}{\sin} - \frac{\cos}{\sin}\frac{\cos}{1}$

$\frac{1}{\sin} - \frac{\cos^2}{\sin} \rightarrow = \frac{\sin^2}{\sin} = \sin\theta$

16) $\sin \cdot \frac{\sin}{\cos} -$

$\frac{\sin^2}{\cos} - \frac{1}{\sin}\frac{\sin}{\cos}$ $\quad \frac{\sin^2 - 1}{\cos} = -\cos\theta$

(17) $\frac{\cos^2}{\sin^2} \quad \frac{\cos^2}{1} = \frac{\cos^4}{\sin^2}$

$\frac{\cos^2}{\sin^2} - \cos^2 \sin^2 \quad \frac{\cos^2(1 - \sin^2)}{\sin^2}$

$1 \quad (\sin^2$

1

$\cot^2(\cos^2) - \frac{\cos^2}{\sin^2} \cdot \cos^2$

$1 \quad \frac{\cos^4}{\cos^4} \quad \frac{\sin^2}{\sin^2} = \frac{\cos^4}{\sin^2} \cdot \frac{\sin^2}{\cos^4} = \frac{\sin^2}{}$

(18) $\frac{\sin^2 x - \tan^2 x}{\tan^2 x \sin^2 x}$

$\frac{\sin^2}{\cos^2}$

$\frac{\cos^2 \sin^2}{\cos^2} - \frac{\sin^2}{\cos^2} \quad \frac{-\sin^2(\cos^2 - 1)\cos^2}{\cos^2}$

$\frac{\sin^2}{\cos^2} \quad \sin^2$

$-1 \quad \frac{-1}{\sin^2} = -\csc^2$

(19) $\frac{(\sin x + \tan x)(\sin + \tan x)}{\tan} + \frac{\cos^2 x}{\tan} - \frac{\sec^2 x}{\tan}$

$\frac{\sin^2 + 2 \cdot \sin \tan + \tan^2 x}{\tan} + \frac{\cos^2 x}{\tan} - \frac{\sec^2}{\tan}$

(20) $\frac{2 \sin x \cos x + (\sin x - \cos x)^2}{\sec x}$

19 $\dfrac{(\sin x + \tan x)^2 + \cos^2 x - \sec^2 x}{\tan x}$

$\left(\sin^2 x + \cos^2 x = 1 \quad \tan^2 x - \sec^2 x = -1\right)$

$\dfrac{\sin^2 x + 2\sin x \tan x + \tan^2 x + \cos^2 x - \sec^2 x}{\tan x} =$

$\dfrac{1 + 2\sin x \tan x + (-1)}{\tan x} = \dfrac{2\sin x \tan x}{\tan x} = 2\sin x$

20 $\dfrac{2\sin x \cos x + (\sin x - \cos x)^2}{\sec x}$

$\dfrac{2\sin x \cos x + \sin^2 x - 2\sin x \cos x + \cos^2 x}{\sec x}$

$\dfrac{1}{\sec x} = \cos x$