

MATH 122

SIMPLIFYING TRIG EXPRESSIONS

Simplify the following trig expressions completely:

1.
$$\frac{\tan^2 t + 1}{1 + \cot^2 t}$$

15.
$$\frac{\sec t \tan t}{\tan^2 t + 1}$$

2.
$$\frac{1}{\sec t - \tan t} - \frac{1}{\sec t + \tan t}$$

16.
$$\frac{\sin^2 t \cot^2 t}{1 - \sin^2 t}$$

3.
$$\sec t \tan t \cos t$$

17.
$$\frac{\cos^2 t - 1}{\cos^2 t \tan^2 t}$$

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

18.
$$\cos t(\sec t - \cos t)$$

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

19.
$$\cot t(\tan t + \cot t)$$

6.
$$\frac{\tan^2 t}{1 - \sec^2 t}$$

20.
$$\frac{\tan t + \cot t}{\cot t}$$

7.
$$\tan^2 t(\csc^2 t - 1)$$

21.
$$\frac{\tan t}{\tan t + \cot t}$$

8.
$$\frac{1 - \cos^2 t}{1 + \cos t}$$

22.
$$\sec t \cot t - \cot t \cos t$$

9.
$$\frac{\cos^2 t}{1 - \cos^2 t}$$

23.
$$\sin t \tan t - \csc t \tan t$$

10.
$$\frac{\sec^2 t - 1}{\tan t}$$

24.
$$\frac{\cot^2 t \cos^2 t}{\cot^2 t - \cos^2 t}$$

11.
$$\frac{\tan t + 1}{\sec t}$$

25.
$$\frac{\sin^2 t - \tan^2 t}{\tan^2 t \sin^2 t}$$

12.
$$\frac{1 + \cot t}{\csc t}$$

26.
$$\frac{(\sin t + \tan t)^2 + \cos^2 t - \sec^2 t}{\tan t}$$

13.
$$\frac{\cos^2 t - 1}{\sin^2 t - 1}$$

27.
$$\frac{2 \sin t \cos t + (\sin t - \cos t)^2}{\sec t}$$

14.
$$\cos t \csc t(\sec^2 t - 1)$$

28.
$$\frac{\sin t(1 + \sin t)}{1 - \cos^2 t} - 1$$

29. $\frac{1 - \tan^2 t}{1 + \tan^2 t} + 1$

30. $\frac{\tan t - \tan t \sin^2 t}{2 \sin t \cos t}$

31. $\frac{\sec t - \cos t}{3 \tan t \sin t}$

32. $\frac{\sin^3 t + \cos^3 t}{1 - \sin t \cos t}$

33. $\frac{\cos^3 t + \sin^3 t}{(\cos t + \sin t)^2}$

34. $\frac{1 + \tan^2 t + \sec^2 t \cot^2 t}{\csc^2 t + \cot^2 t \csc^2 t}$

35. $\frac{\cot t \sec^2 t - \cot t}{\sin t \tan t + \cos t}$

36. $\frac{\cos t}{1 + \sin t} + \frac{\cos t}{1 - \sin t}$

37. $\frac{\sin t}{1 - \cos t} + \frac{1 - \cos t}{\sin t}$

ANSWERS

1. $\tan^2 t$

2. $2 \tan t$

3. $\tan t$

4. $\cos t$

5. 1

6. -1

7. 1

8. $1 - \cos t$

9. $\cot^2 t$

10. $\tan t$

11. $\sin t + \cos t$

12. $\sin t + \cos t$

13. $\tan^2 t$

14. $\tan t$

15. $\sin t$

16. 1

17. -1

18. $\sin^2 t$

19. $\csc^2 t$

20. $\sec^2 t$

21. $\sin^2 t$

22. $\sin t$

23. $-\cos t$

24. 1

25. -1

26. $2 \sin t$

27. $\cos t$

28. $\csc t$

29. $2 \cos^2 t$

30. $\frac{1}{2}$

31. $\frac{1}{3}$

32. $\sin t + \cos t$

33. $\frac{1 - \cos t \sin t}{\cos t + \sin t}$

34. $\tan^2 t$

35. $\sin t$

36. $2 \sec t$

37. $2 \csc t$