

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

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

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

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

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

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

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

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

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

ANSWERS

1.  $\tan^2 t$

14.  $\tan t$

27.  $\cos t$

2.  $2 \tan t$

15.  $\sin t$

28.  $\csc t$

3.  $\tan t$

16.  $1$

29.  $2\cos^2 t$

4.  $\cos t$

17.  $-1$

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

5.  $1$

18.  $\sin^2 t$

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

6.  $-1$

19.  $\csc^2 t$

32.  $\sin t + \cos t$

7.  $1$

20.  $\sec^2 t$

8.  $1 - \cos t$

21.  $\sin^2 t$

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

9.  $\cot^2 t$

22.  $\sin t$

34.  $\tan^2 t$

10.  $\tan t$

23.  $-\cos t$

35.  $\sin t$

11.  $\sin t + \cos t$

24.  $1$

36.  $2 \sec t$

12.  $\sin t + \cos t$

25.  $-1$

37.  $2 \csc t$

13.  $\tan^2 t$

26.  $2 \sin t$

